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LECTURES

ON

INDIAN RAILWAY ECONOMICS

PART I

BY

S. C. GHOSE,

HONORARY LECTURER, CALCUTTA UNIVERSITY, POST-GRADUATE TEACHING IN ARTS

[FORMERLY OF THE G. I. P. RY. AND THE E. I. RY.;

LATE GENERAL MANAGER OF THE B. K., A. K., K. F. AND B. D. R. RYS.;

AND ALSO FOR SOME TIME SPECIAL OFFICER WITH THE RAILWAY BOARD,

GOVERNMENT OF INDIA, RAILWAY DEPARTMENT.]

PUBLISHED BY THE

UNIVERSITY OF CALCUTTA

1922

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INDIAN RAILWAY ECONOMIC SERIES

I

Railway Finance and Railway Policy in India

In my two previous introductory lectures I gave you the general outlines of railway-making in India. I explained to you that the Railways of India were originally provided out of capital subscribed by financiers in England. I also explained to you that the difference between the Railways of England and America and of India was that while the English and the American Railways were built without any financial assistance from the Government, the Indian Railways, even when first started, were helped by the Government in this way that the Government bought land for the use of the Railway, the cost of which was not charged to the Capital account of the Railway but borne by the Government, and the Government gave a minimum guarantee of 5% annual dividend on the Capital spent. I also told you that in cases where the guaranteed interest was not earned by the Railways it had to be made good out of India's revenue, by taxation in many cases, and the making up of this deficit was a heavy charge against the revenues of India annually for many years.

It was further explained by me that gradually the Railways were acquired by the State, either by cash or by annuity payments, and that all further Capital, after the date of purchase, was mostly provided for by the Government as follows:

(1) Out of surplus of general revenues of the Government and cash balances.

(2) By raising of Capital by the Government in Rupee loan in India; or by sterling loans in England; or

(3) By issue of debentures in England on the guarantee of the Secretary of State for India.

(4) Savings Bank Deposits.

(5) Appropriation from Famine grant for avoidance of debt.

(6) Half profits on Rupee coinage.

Here I would like to tell you that there is a difference between ordinary debentures and Indian Railway debentures issued in England. Debentures ordinarily mean a borrowing on mortgage of property to the extent of the borrowing, but in the case of our Railway debentures there is no mortgage of the particular Railway property, in respect of which debentures are issued.

The debentures are guaranteed by the Secretary of State for India. So the debenture-holders have a greater security than even the mortgage of the Railway property. They have the security of the Secretary of State for India, consequently of India and her resources.

In the case of loans and debentures the Government have to guarantee a fixed rate of interest, so that the financial responsibility is that of the Government of India. The Government have also to guarantee a dividend of 3 or 3½ % on Company's share of the Capital. But arrangements are made under which a share of surplus profits (after payment of all charges of interest on Capital whether provided by the Government or by the Company, interest on annuities and annual payments of annuities in redemption of the Capital) are given to the Companies.

It would be interesting to show you in what shares generally the Capital was held by the Railway Company, who worked the Railway, and the State, which owned the Railway, after the Railways had been purchased by the Government. I will give you as an instance—the case of the B. B. and C. I. Railway. On 31st December, 1911, the Capital, after purchase by the Government, was as follows :

Secretary of State's (Government) Capital.	£28,000,000 (preferred Capital).
Secretary of State's (Government) Capital.	£10,500,000 (deferred Capital).
Company's Capital ...	£2,000,000 (preferred Capital).

After this date (31st December, 1911) the additions of Capital were to be kept on, as far as possible, in the ratio of £28,000,000 of the Secretary of State and of £2,000,000 of the Company, so that by far the largest amount of Capital would be that of the Government.

Now to come back to the surplus profits. The division of the surplus profits between the Government and the Companies was generally in proportion of the share Capital held by each. And this payment of a portion of the surplus profits, combined with the guaranteed dividend of 3 or 3½% made the total amount of dividend, payable to the Company on its share of the Capital higher than 3 or 3½% per cent. and in some cases it was 6% or more as shown for instance in the evidence of the Agent, E. I. R., before the Acworth Railway Committee.

When the guaranteed interest was reduced from 5 to 3½ or 3% it was thought that the best plan would be to pay a lower rate of interest. and to give the Companies a share of the

surplus profits, because it was argued that if a high dividend was paid (5 % was surely an attractive rate of dividend) there would be no incentive on the part of the railways to economise either in Capital expenditure or in the working expenses incurred out of the revenue, because the companies would know they would get their 5% dividend in any case. And it is said that the Railway expenditure during the early period of railway history in India was extravagant as much owing to want of experience in making railways in this country as o ving to there being no incentive on the part of the companies to economise because of the 5% guaranteed dividend. But there is one drawback of the payment of surplus profits, as there are no Reserve Funds on Indian Railways. Reserve Funds were not created for Indian Railways apparently because the Government could not afford it, *i.e.*, to provide money out of Indian revenue for railway improvements and to let this money lie idle and accumulate, because perhaps it was thought that with the large demands on Indian Revenue for expenditure in other directions and for relaxation of taxes the Government could not afford to keep money accumulating for Railway Reserve Funds. The resources of the Government on the whole have seldom been adequate and the Government cannot but deal with the demands made upon it in order of importance and reserve funds for railways have not therefore been created yet. Of course you know the history of other reserve funds, such as, Standard Gold Reserve. I touched upon this particular problem in its relation to railway expenditure in India in 1912. I quote a reference from my writing then :

"Now, the next point to consider is how best to find funds for railway construction and equipment. The Hon. Mr. Webb's letter of 27th August, published in the *Pioneer* of 2nd September, 1912, raises this matter very prominently. He points out that the cash balances, held in England out of India's revenue, have gone on increasing year after year since 1907, and that the Secretary of State, with from £17,000,000 to £18,000,000 at his disposal which he lends out at 2½ per cent., has borrowed £3,000,000 at 3½ per cent. in London. This policy of keeping large balances of surplus money from India's revenues in England, and at the same time borrowing money there for Indian Railways, at a higher rate of interest than is obtained by lending out, has been described by some, to put it mildly, as very unwise. How far such a remark is justified it is difficult to say, but it cannot be denied that, had at least some portion of the large sum held by the Secretary of State out of India's revenues been available here, there would have been a distinct advancement in the progressive work of the country."

To return to surplus profits again ; the surplus profits were divided between the Government and the Railway Companies before large provision was made for big renewals, replacements or additions out of revenue by the creation of a system under which a greater allotment out of revenue could be made for each railway for productive works and improvements.

In the case of the Indian Trunk Railways, whether worked direct by the State or by the agency of the companies the ownership is that of the State. And the functions of State Railways have been described by Raper in his Railway Transportation to be as follows :

(1) To obtain revenue for the public treasury from the profits.

(2) To make expenses and to create large public works.

(3) To render the maximum public service quite irrespective of revenue.

The Indian State-owned Railways, whether worked directly by State or by Companies, have been manipulated to obtain revenue for the public treasury from the profits. Therefore, the total Railway revenue from all the State-owned Railways (after payment of all the charges, such as, interest on Capital, annuity payments, interest on annuities, surplus profits) is credited to the general revenues of the Government (along with the other revenues such as land revenue, customs, Post and Telegraph, etc.) and then as grants are made for other works grants are also made for Railways out of the general revenue.

There has been great agitation going on for years that the Railway Budget should be separated, *i.e.*, the Railway revenue and Railway expenditure should be taken separately from all other revenue and expenditure of the Government, and that the Railway Revenue should be utilised for Railway purposes only. The argument advanced is that if the Railway budget is separated, the Railway facilities would increase faster by more money being available for Railways. This is true, but there is the other side of the case too. When the Railways were first made in the country, the deficits in the guaranteed interest were made good out of taxation of the people, and it was shewn, a few years ago, that the loss to the Government to the working of the State Railways was something over 320 crores of rupees. Therefore, if when the Railways were non-paying concerns the people of the country were taxed to make good the losses on Railways, it is argued by some that it is only right that when the Railways became paying the people should benefit by relaxation of taxes, and by part of the Railway revenue being spent in other public

and nation-building works. For this and other reasons, the Railway budget has not yet been separated, but the Railway expenditure has to be met and for this purpose the Railway rates and fares have been increased and loans are being raised. And the worst of it is that the Railway earnings are not improving, mainly because for want of facilities and wagons, but the Railway expenses are going up;—the employés' wages have gone up, the cost of coal, Railway stores and materials have gone up, and owing to the use of boilers, rolling stock and rails, that should be replaced, repair charges are heavy,—last year on the G. I. P. Railway the proportion of working expenses to gross earnings was 90 per cent. so that the return on the Railway Capital is not likely to be great in future, and it is doubtful whether it would be possible for the Government to earn on the money, that is being raised by loans, even the full rate of interest that has to be paid, for some time on some railways.

But it is argued that there are greater direct and indirect advantages to the country by Railways even if there be some loss in working the Railways.

Now, on the same grounds another phase of Indian State Railways might be discussed. As already stated the State Railways may be worked in three ways :

(1) To obtain revenue for public treasury.

(2) To make expenses and to create large public works.

(3) To render the maximum of public service quite irrespective of revenue.

The Indian State Railways are worked to obtain revenue for the public treasury and therefore, they are supposed to be run on commercial principle, *viz.*, for earning money and for efficiency. I have already told you that the Railway projects in India were from the very start divided between (I) commercial and (II) political, *viz.*, some mainly for commercial purposes to earn money and others purely for political purposes such as the Railways on the North Western Frontier. The Railway Board laid great stress in their evidence before the Railway Committee, on the point that unless the Railways were worked on commercial principles money for Railway expenditure would not be attractable, but seeing that money for Railway expenditure is being raised by loans at the market rate of interest and also seeing that the new Railways, even branch lines in India, are going to be made by payment of interest at 6 per cent., it is very questionable whether the argument used by the Railway Board is a very strong one. The railway Capital is to be attracted in future by attractive rates of fixed interest. The Railway Board perhaps meant that with Railway facilities

wanting so largely in India and the Railway expansion in India being limited it was essential that the Indian Railways should be worked to earn more and more money, *i.e.*, on commercial principle, to provide funds for improvements and extensions.

To revert to the main issue; if it is argued that the past losses on Railways were more than counterbalanced by the benefit which the country got by the making of the railways it can also be argued by those, who are opposed to the working of State Railways purely to earn money for the public treasury, that the railways should be used to further the interests of India's economic and industrial development even by sacrifice of some portion of revenue and that as the Railway Revenue goes to the same coffer as the Land and other Revenues, *viz.*, the duties on export and import of goods, taxes on industries, it would be the same whether the Railway Revenue is more or the Revenue on the other heads, just mentioned are more. One has got to see what is best for the country, taking the whole together. Thus it may be necessary, after a few years, to revise the railway policy and not to run the Railways simply to earn money for the public treasury but also to render maximum of service to the country by sacrifice of certain portion of revenue should that be necessary.

Next, to deal with some aspects of the benefit that has come through our railways. They are the same as railways, shipping and other improved methods of transportation have offered to other countries. They have widened the market for the producer's products, they have equalised prices but have raised prices too at the producing centres where there is no longer plenty of supply. The Railways and shipping have brought most parts of the world in closer communication with one another in matter of exchange of views, thoughts, trade, commerce, or in a few words they have helped advancement of what is called modern civilisation.

In India, it is particularly to be pointed out that the Railways have, in times of stress, been useful in affording relief by importing foodstuffs into the affected areas and that without the Railways the results in times of famine and other calamities would have been more disastrous. It is argued that there is no longer food famine but money famine. It is also said that the Railways have enabled the ryots to dispose of their produce at a higher price and to find extensive markets for their increased products, but with the higher prices the cost of living has also increased.

On the other hand, it was disclosed before the Indian Industrial Commission that the Railway policy of charging, at least in the past, concessional rates for the Port traffic (on the

ground that such traffic gave the Railways better revenue by reason of long distances,) encouraged large exports of raw products such as, wheat, oil-seeds, cotton, etc., for the use of mills and factories in foreign countries, to the detriment of the development of India's indigenous industries and also that because of low rates granted for imports of foreign goods for the same reason, *viz.*, that such goods gave long leads to the Railway from the ports and also helped to find part loads for wagons that returned back to the interior after discharging produce at the ports, the foreign goods were able to compete more successfully with India's local production. The Indian Industrial Commission pointed out two such prominent instances. The Commission drew attention to the fact that large imports of foreign sugar coincided with the large reductions in railway freight on sugar from the ports to the interior, due to the competition between railways. The Industrial Commission also drew attention to the fact that while the railways were encouraging large exports of raw hide and skins from the United Provinces to the ports by granting lowest rates possible, thereby subsidising the foreign leather manufacturing industries, they were not granting similarly low rates to the local leather manufacturing industries at the same time, and it was also shown that in cases of port traffic low rates were not necessary in all cases, for instance the foreign exporters of sugar to India and the foreign importers of Indian raw hides and skins were quite able to bear and pay the higher rates owing to lower cost of production and the higher prices paid for their finished products.

It is to be admitted to a certain extent that it is essential that railways of India should not be worked mainly to earn revenue for the public treasury and that a change in this policy should come the moment the Railway Finance and the General Finances of the Government are in a somewhat better condition, and it may be necessary that sacrifice of India's railway revenue to a certain extent should be made to help the economic and industrial development of the country, especially as any increase in general prosperity, in agriculture, in industries, will also mean increase in revenues of the Government from Income Tax, Land Revenue, taxes on industries and duty on exports and imports, etc. But it is also to be borne in mind that the purchase money of the Railways of India is not yet fully paid up by the Government and that this money has to be paid out of Railway revenue in redemption of Capital and also the Railway expenditure is going to be heavy. In this connection I would like to draw attention to the following remarks on page xi of Monograph on Indian Railway Rates.

"At the end of the year 1915-16, the total amount of the capital of the State lines leased to companies for working was £365,813,347 of which actual State outlay was £180.530,775 and the balance was made up principally as follows :

£68,772,691 net outstanding remaining to be paid off to original investors in annuities.

£51,259,000 amount of outstanding debt, yet to be paid, incurred by the Government in connection with the purchase of railways.

£44,550,948 Debentures and Debenture stock raised in England.

£18,061,829 Company's share of the nominal capital.

£2,500,000 Advances of capital by Secretary of State in England to Companies.

With such large sums outstanding on account of capital, which is the debt of the Government of India to be paid out of the revenues of the Railways, a certain amount of caution in the matter of general reduction of rates is necessary, although in particular cases when a railway finds that it is lacking in business and that it has facilities to carry additional traffic reductions to meet such conditions are fully justified, especially when it is known that the reduced rates and fares will increase the volume of business by extending the demand or the markets of consumption or by reduction in prices at places where owing to high freight, business has been hitherto impossible or restricted."

INDIAN RAILWAY ECONOMIC SERIES

II

Railway Finance: New Railway Projects

No Railways can be made in India, even in the Native States, without the sanction of the Government of India. The Government of India have got to see that

(1) the Railway projects put forward would serve a useful purpose;

(2) the Railway would command sufficient traffic and would be a paying one;

(3) the Railway in question would not adversely and seriously affect the interests of existing lines;

(4) the agency proposed to construct and to work the line is suitable;

(5) the promoters can command the capital required for the proposed railway.

The Government have generally got to guarantee the minimum annual dividend, which is going to be 6 per cent. in future, and to provide land, out of India's general revenues; therefore, it is only natural that the Government should take all these precautions. I may mention here that though in the case of Native State Railways the various States may provide the money, the railway of one Native State sometimes runs through another Native State, and may form junctions with railways in British territory and may thus affect interests other than those of the Native State, which proposes to build and own the railway, and hence Government sanction is necessary. Even in the case of a Government-owned Railway, the Railway Department of the Government of India have got to satisfy the Finance Department of the Government of India that the railway in question would be a paying one and the Finance Department has got to see about the ways and means.

During the early period of railway construction in India, no correct idea could be formed of the traffic prospects of a railway or of the rates and fares to be charged, so that any estimate of the earnings was very problematical and the rates and fares were experimental.

Originally generally the railways were made with a view to develop local areas and different provinces, or in other words they

were non-competitive railways, but gradually they joined one another, or came into the same or near territories, and competition came by itself. For instance, the G. I. P. Railway from Bombay joined the Indian Midland Railway and eventually they were amalgamated. Similarly, the B. B. & C. I. Railway and the R. M. Railway metre gauge made connections with one another and eventually these two railways were also amalgamated. Now both the G. I. P. Railway and I. M. R. and the B. B. & C. I. Railway and the R. M. Railway traverse different territories but eventully they meet in Agra, Delhi, Cawnpore ; and connections were also formed in Central India and in the Bombay Presidency between these two systems, through branches, say at Amalner, Khandwa, Ujjain, and the result was that there were serious competitions with one another until divisions of territories and traffic were arrangeed. Now the East Indian Railway is a Bengal and U.P. line, but it has to compete with the Bombay lines for traffic of the U. P. seeking an outlet *viâ* the ports of India ; *e.g.*, for traffic in export of wheat and oil-seeds from the U.P., from Districts west of Cawnpur there was keen competition between the Calcutta and the Bombay ports, each port trying to draw as much of the traffic it could, and each Railway tried to do the same. Here also competition has been regulated by arrangements between Railways to which I shall refer to when I come to the subject of Railway rates.

Therefore you will see that in making new railways, particularly in sanctioning new railways, great care is essential, and the first and foremost care is to see that the railways in question would serve a useful purpose.

The Railway Engineer would make a survey of the line and find out the proper alignment from an Engineering point of view, but it is the business of traffic officers to see that this alignment is correct from traffic point of view as well ; in fact the proper procedure would be for the traffic officer to say where he wants the railway and for the Engineers to say whether there are any unsurpassable difficulties in making such a railway, and what it would cost. In the case of any deviation the traffic officer should see whether such a deviation would make any serious difference in the earnings or not.

Firstly, the traffic earnings have to be ascertained mainly by finding out (1) the population, (2) and the area under cultivation of each crop, (3) the existing traffic, (4) the possibilities of development through industries, new marts, etc.

To be accurate it would be the best policy to test the Government figures of population per square mile in the respective thanas, to be traversed by the railway, by sending out reliable

men to again ascertain the population of the villages within a certain belt on both sides of the proposed railway. And this belt would vary according to circumstances. If the railway would serve a territory, least served by any other railway or by a navigable river, then the belt could be a large one. Generally it is safe to take the population on both sides of the line within a distance of 6 to 7 miles on each side in such cases.

Having ascertained the population, the next step is to find out what the railway would get out of the population. Now it is certain that all the population are not going to travel, and it is also equally correct to say that many would travel several times in a year.

In the case of a short branch line of say 50 miles or 60 miles length, it would be unsafe to take more than 12 or 14 miles as the average distance to be travelled ; in fact 10 miles would be most correct. On reference to page 476 of the Monograph on Indian Railway Rates you will see that taking all the Indian Railways together, which include the big Trunk lines of great lengths, the average distance travelled by passengers was less than 42 miles.

After fixing the average distance, and getting the figures of population, the next step is to fix the fare. In the olden days an average fare of $1\frac{1}{4}$ to $1\frac{1}{2}$ pies per passenger per mile was taken, but the fares have gone up considerably, and they are hardly likely to come down to the old level for some time to come ; therefore 2 to $2\frac{1}{2}$ pies would be a fair average. To arrive at the passenger earnings, the following calculations may be made :

Population × average distance × fare per mile.

The goods earnings are estimated by taking the productions, that are largely exportable such as cotton, jute, and in the case of edibles an allowance of 1 lb. per population per day is made for local consumption and the balance is taken as available for export, and the railway rate for edible grain, oil seeds is taken at a lower figure per mile than for cotton and jute. Having found out the quantity available for export the next step is to see what are the present methods of conveyance and the cost of such conveyance, but if the railway be a railway of 40, 50 or 60 miles length, rest assured that if there are roads to the same places, which the railway would serve also, the railway would not get the traffic for a distance up to 20 or even 30 miles for some time to come, because carts will take traffic in grain, etc., from the villages to the shops of " Aratdars " in the marts and bring back return traffic in salt, oil, tobacco, goor, etc. But in time as marts got established at the new stations, where new merchants come, the traffic is secured to the railway. Therefore in the beginning low

rates have got to be charged and the estimate of the earnings of the goods traffic is made by

(1) estimating the surplus produce that would be exported, on the basis already given, to the marts

(2) probable tarffic in inward goods such as, salt, tobacco, goor, oil, etc., etc., and also coal. The railway rates are taken for the purpose of estimate on the basis of rates charged in similar cases on the neighbouring lines. Too high or too low a rate is rendered somewhat impossible by the Government fixing the maximum and minimum rates, although there is a wide margin between the two. An all-round rate of $\frac{1}{4}$th to $\frac{1}{2}$ pie per maund per mile is a fair rate for purposes of estimate.

Having thus ascertained probable goods and passenger traffic and the earnings therefrom, the results are put to test by the use of some of the methods known to exist.

One method is to take the length of the line, the belt of the tract to be served, the population and to take a Rupee per head per population per year thus:

Length say 32 miles × width or the belt of the country on both sides of the line, say 4 miles on each side, *i.e.*, 8 miles × density say 600 people per square mile × Re. 1 per head = Rs. 1,53,600.

The next step is to deduct the working expenses, which is done by taking the percentage of working expenses to gross earnings either on the neighbouring Railways, of similar lengths or of railways worked under similar conditions. This percentage being off the gross the net earnings are thus arrived at. The figures of estimate of cost of building, and equipping the lines and of providing the rolling stock, workshops, etc., has to be found out by the engineers, and on this cost it is necessary to work out what would be percentage of the net earnings to the total capital outlay. If the return is close to the figure of the guaranteed interest asked for by the Railway, provided there are no other objections than those on financial grounds, the Railway is allowed to be made.

The District Gazetteers, the report of the revenue settlement officers, the census reports and the Statistical District Gazetteers, the maps issued by the Surveyor General's Department (scale 1″ to a mile) and the local thana maps and the thana record of population will be found to be very useful in making enquiries of traffic prospects and each thana besides being able to give the figures of population of the different villages under its jurisdiction will be able to give information regarding attendants at "Hats," fairs, Melas, etc.

INDIAN RAILWAY ECONOMIC SERIES

III

Railway Rates Policy

It is the business of the Railways to carry goods and passengers.

We will deal with the goods traffic and the freight rates first.

Some economists have said that it should be the object of the Railways to reach the widest class of customers. Others say that the railways must carry the maximum amount of traffic at minimum of profit, while again one or two others have pointed out that as the railways are not in the same position as the steamship companies, which can transfer the streamers to any place they like to secure better prospects or to abandon a non-paying place, the railways must stick to the place, where they have made the railways, and that, therefore, the railways must of necessity do the best they can for the territories and the communities they serve, as with the prosperity of the particular territories and communities the prosperity of a particular railway is allied together. All these remarks and observations are correct to a great extent.

The principle that the Indian Railways were made for the country and not the country for the railways is recognised, and Lord Sydenham (then Sir George Sydenham Clark) as Governor of Bombay made public utterance to this effect in his speech when the merchants and people of Broach referred to the serious situation created at Broach by the action of the B. B. and C. I. Railway Company, which did its utmost to hamper the steamer traffic between Broach and Bombay—details of this competition are very interesting and you will read this some day on pages 187-89 of the Monograph on Indian Railway Rates.

The Railways have been made for this country and as the country (*i.e.*, the Government) own the railways, it is more important that the railways of India should be worked to the best interests of the Indian people. No one made this so clear as the Government of India did in one of their despatches to the Secretary of State for India (*vide* page 19 of the Monograph).

" In India, where the Government gives a guarantee of interest, in addition to the other privileges allowed to the Railway

companies, we are of opinion that it has a still stronger right, and is bound, by a more imperative duty, to look to the interests of the people in the matter, for our belief is that a railway best serves its own interests as well as those of the country by accommodating itself to the wants of the people."

As I have already told you, the Indian State-owned State Railways, whether worked by the direct agency of the State or of the lessee Companies, are worked for the purpose of earning money for the public treasury, and are, therefore, worked as commercial concerns. This position was made clear in Secretary of State's despatch No. 132 of 19th October, 1882 (quoted on page 26 of the Monograph), in which he stated as follows :

" That the rates on Indian Railways should be dealt with as would be by independent companies.

" That the Railway administrations should be given liberty to fix such rates as are considered most advantageous to their respective lines.

" That the interests both of the Railways and the trade generally would be better served by accepting the legitimate consequences of competition.

" That the interference of Government would be justified only in cases where companies, under the security of a guarantee, might fix rates below what would cover cost of transport with a margin of profit."

The principle that each railway should do its best for itself has been recognised always, and if you will refer to page 151 of the Monograph on Indian Railway Rates you will observe that in 1905, at a meeting, with the Railway Board to terminate a war of Rates, it was pointed out by the Agent of one of the railways that the railway rates should be adjusted on a competitive basis, *i.e.*, on a basis that would recognise what would be the position if each railway did its best for the port it served and worst for the rival railway and the rival port.

Now this position requires to be explained. Before I do so I must first tell you briefly that the railway rates under each class (a number of commodities being grouped into 5 or 6—now 10 classes—for purposes of charge) are regulated within certain maxima and minima fixed for each class by the Government. The maximum rate for agricultural productions until last April (1922) was $\frac{1}{3}$rd pie per maund per mile and the minimum rate $\frac{1}{10}$th pie per maund per mile. I will deal with the maxima and minima rates later but for the present, I am explaining to you the principle under which the general rates

policy of the Indian Railways is conducted. And I will show you by concrete example what is meant by each railway doing its best for itself and the worst for the rival Railways. Now for instance, Bindki Road is a station on the East Indian Railway 605 miles from Calcutta and 28 miles east of Cawnpore, and the distance from Cawnpore to Bombay is 839 miles. Therefore the distance from Bindki Road to Bombay, *viâ* Cawnpore, is 867 miles, *i.e.*, 839+28. So the distances from Bindki Road to Calcutta and Bombay are :

605 miles to Calcutta
867 miles to Bombay.

Suppose for wheat and oilseeds equal mileage rates are quoted to both the ports say $\frac{1}{6}$th pie per maund per mile; the rates would be

To Calcutta	...	101 pies
To Bombay	...	141 „

or the difference against Bombay or in favour of Calcutta would be 40 pies.

By far the largest partners in both the E. I. Railway Company and the G I. P. Railway Company (which companies respectively work the lines from Cawnpore to Calcutta and Cawnpore to Bombay) are the Government of India, but because of the fact that these 2 railways are worked by separate companies the rates of both the railways were manipulated by each Company to suit each Railway's interests. This is not only the case between two company-worked State lines but between the State-worked State lines too. For instance, O. and R. Railway can manipulate its rates in its own interests and against the interests of the N. W. Railway. We will deal with this point a little later. Let us deal with the Bindki Road first. We have already seen that with equal mileage rates the difference in favour of Calcutta and against Bombay is 40 pies. But the E. I. Railway may not be prepared to accept $\frac{1}{6}$th pie for a distance of 28 miles from Bindki Road to Cawnpore, *i.e.*, the same rate per mile as they may charge on much longer distance of 605 miles from Bindki Road to Calcutta (although it may be noted here that the total distance from Bindki to Bombay is much longer than the distance from Bindki to Calcutta and if both the Railways were worked by one Company the question of charging a high rate for 28 miles from Bindki to Cawnpore would not have then come in). Under present conditions and observing the policy laid down and accepted by the Government that each railway should be worked in its own individual interest the E. I. Railway can claim that the Railway rate from Cawnpore to Bombay should be at its maximum, *viz.*, $\frac{1}{3}$rd pie per

maund per mile and on this basis the charge for 28 miles would be 9 pies, so the total rates to Calcutta and Bombay will be

To Calcutta at $\frac{1}{6}$th pie for 601 miles	...	106 pies
To Bombay for 28 miles over the E. I. Ry.	9 pies	
To Bombay for 839 miles over the G. I. P. Ry. at $\frac{1}{6}$th pie ...	140 „	
		149 „

or the difference in favour of Calcutta and against Bombay will be 48 pies against 39 pies at equal mileage rates.

But each Railway has not yet done its best for itself and the worst for the rival.

The E. I. Railway could bring down its rate from Bindki to Calcutta (Howrah) 605 miles to 61 pies at $\frac{1}{10}$th pie per maund per mile, and at the same time charge a rate of $\frac{1}{3}$rd pie for 28 miles (9 pies) *plus* another charge of 9 pies per maund on account of terminal and short distance charge. Although I will explain the terminal and short distance charges later, I will just refer to them here. The Railway Act defines the terminals as follows:

"A terminal charge includes charges in respect of stations, sidings, wharves, depôts, warehouses, etc., etc. (*vide* page 578 of the Monograph)."

This is a distinct charge from the rate, which is simply a charge for the haulage of goods and not for the use of the terminal facilities and this terminal charge may or may not be levied at the option of the Company. Thus you will see that the E. I. Railway can charge from Bindki Road to Calcutta 605 miles @$\frac{1}{10}$th pie or 61 pies and from Bindki Road to Cawnpore 28 miles 9 pies @$\frac{1}{3}$rd pie *plus* 9 pies terminal and short distance charge or 18 pies in all.

And the G. I. P. Railway can charge $\frac{1}{10}$th pie from Cawnpore to Bombay for 839 miles or 84 pies, so that the charge for Bombay will be 84 *plus* 18 or 102 pies and for Calcutta 61 pies or the difference in favour of Calcutta and against Bombay would be 42 pies. And this difference is called by the Railways bedrock difference. I have shown all this to you to make it clear that the Railways of India are allowed to work as if each railway was an independent private Railway Company working for itself and run as a purely commercial concern.

Next to come to the policy of charging rates for exports of raw materials from India. The Indian Railway authorities perhaps work under the same belief as Lord Morley did. I would

quote the following from Lord Morley's speech in the House of Commons on the Indian Budget for 1906 :

" The strength of India, the prosperity and comfort of India, her trade and commerce, hang on exports. If the market for her food-stuffs and raw materials, her grain, timber, tea and coffee, her supplies of oils, is not ample in volume and favourable in its circumstances, how is she to bear the weight of her expenditure "? when referring to " Oil " Lord Morley probably referred to " Oil Seeds " and to Burmah Mineral Oil.

In the past, the raw materials received low rates for their carriage to the ports, so did the imported goods from the ports to the interior.

In further referring to the Railway rates policy I should also draw your attention to the preliminary remarks on pages 5 and 6 of the Monograph on Indian Railway Rates :

" About the year 1865, it seems it was alleged by some in England on behalf of the companies, that the Government in exercising control over Railway rates in India might think fit to require the adoption of such a scale of charges as would bring the Railway within the compass of as many people as possible, without considering the effects of too low a scale upon the receipts or profits. The Government of India denied that any such idea had ever been entertained. The policy of the Government was summed up in the following words :—" The people in India are now taxed to pay the guaranteed interest. For their protection the Government exercises a control over the Railway companies with the twofold object of securing such a system of good management as shall provide all the legitimate advantages of railway communications for the country at large as well as such profits as shall release the Government from payment of the guaranteed interest; and in the second place, of affording the best means of encouraging capital and enterprise in India by affording an example of success in works which have been undertaken..... It must not be thought, however, that high profits and high fares are synonymous; on the contrary, low fares, that is to say low compared with those in Europe, are perfectly compatible with large remunerative receipts."

The Railway rates in India were, for the first few years, on an experimental basis, but the tendency of the compaines in the beginning was to stick to high rates; the result was that the railways were not earning sufficent revenue to pay the guaranteed dividend. This caused anxiety to the Government, and it was expressed that there was no reason why there should be found in India any exception to the general rule that the low rates means increase in traffic.

It is not exactly known on what basis the maximum rates were first fixed by the Government; but anyhow the maximum rates were, even in 1865, as follows :

for first class—about $\frac{1}{3}$rd pie and $\frac{1}{4}$th pie per maund per mile;
for 2nd class—$\frac{1}{2}$ pie per maund per mile;
for 3rd class—$\frac{2}{3}$th pie per maund per mile and so on ;

or very nearly the same as they were in March 1922. On pages 2 and 3 of the Monograph you will find the basis of grouping of the several goods into various classes. More or less the same principle obtains to-day as in the olden days. The value of the goods, the volume and continuity of traffic generally determine the class of rates ; the lower the value and greater the volume, the lesser the rate.

The slow progress in the advancement of Railway earnings during the first 12 or 15 years, the increase in railway earnings in some cases with a decrease in traffic, and the fact of traffic moving for long distances by roads and rivers, even for 200 to 300 miles, although there were railways close by, compelled the Government to come to the conclusion that the railways were not charging such rates as would encourage free movement of traffic by rail. The Government had the power, under the terms of the contracts, of fixing the rates and fares (*vide* Chapter 1, page 1) and the Government pressure was brought to bear upon the railways to reduce the rates in 1874-75. A reference to page 21 of the Monograph will show the extent of the reductions in rates made in 1876 and also how the revenues of the Indian Railways benefited from these reductions. And in the new contract with the East India Railway in 1879 greater powers were secured by the Government in matter of fixing of rates and fares (*vide* page 23 of the Monograph). And in 1883, the Government of India enunciated the principles under which the fixing of rates and fares were to be regulated.

Briefly, the principles laid down were :

"(1) That the management should principally aim at attracting the maximum quantity of traffic the line could carry at reasonably low rates.

(2) That all rates, though capable of classification into groups, should be considered as 'Special' and be fixed with due regard to

(*a*) what the article would bear,
(*b*) the quantity obtainable.

(3) That the rates might vary between limits represented by

(*a*) the cost of carriage,
(*b*) the tax which the trade will bear.

(4) That the whole circumstances of the traffic as regards empty running, intermittent nature of traffic and the effect of competition by other routes, should be considered.

(5) That in the case of competition, the principle of rate calculation should be materially altered. While such factors as capital cost, gradients, cost of fuel and carrying power, should be duly taken into account, the rates must ultimately be governed by the necessity of attracting traffic and not by any arbitrary standard of profit."

Although the views expressed were not very clearly defined, the pronouncement was important as indicating the acceptance of two general principles which are now recognised by most railway economists. These are:

First.—That in ordinary circumstances the cost of service represents the bottom limit of a rate while the maximum depends on what the traffic will bear, or as it is now more commonly expressed, on the value of the service to the trader.

Second.—That in special circumstances the bottom limit disappears to a certain extent, and determination of the rate is influenced solely by the consideration of securing the maximum traffic.

As it was obviously impossible to provide for all the special circumstances which might arise, the Government in order to protect its own interest, involved in the shape of guaranteed interest on the capital outlay on Indian Railways had perforce to limit the power of the railways of entering into or carrying on wasteful competition by fixing minimum rates a few years later.

It was about this time (or more accarately 4 years later) the Government in order to protect its own interests involved in the shape of guaranteed interest on Company-owned railways, fixed, in addition to the maximum rates, the minimum rates, below which the railways could not go down in their rates. In the matter of minimum rates for goods (other than productions and minerals) the Government fixed the figure at the average rate, which the railways were getting at the time for conveying goods traffic, *i.e.*, $\frac{1}{6}$th pie per maund per mile and the minimum for the agricultural productions and minerals was fixed at the average cost of carriage, *i.e.*, almost at the cost price (or $\frac{1}{10}$th pie per maund per mile.

The average cost of haulage does not, however, show the actual cost of haulage of traffic like grain or seeds, which is comparatively cheap to carry owing to better loads and regularity in despatches, though not so cheap as coal or manganese.

The average represents the cost of hauling and handling of all descriptions of traffic, including irregular and small consignments and bulky articles occupying more space in wagons than in proportion to its weight as well as of traffic for very short distances, which involve wagons standing for a longer period at stations than moving with loads. With a consignment for 50 miles the wagon will be standing 2 days (one day at the despatching station and one day at the receiving station), while it will be moving with load only one day. Therefore, the statistical cost of haulage cannot help one in deciding what a particular consignment costs to haul, but it nevertheless gives a figure, which ought to assist in arriving at a decision in fixing the minimum rate for large number of principal commodities taken together.

The maximum rates were fixed to protect the public from prohibitive railway rates.

INDIAN RAILWAY ECONOMIC SERIES

IV

Railway Finance : Capital and Revenue Expenditure

As already stated more than once, the first railways constructed in India were the guaranteed Railways. They were the property of the Companies. These Companies were granted leases of land required for use. The Government granted concessions usually for 99 years, with the option of buying the property of most of the railways at the end of 25 or 50 years from the dates of the contracts, and had undertaken to pay in London during the currency of the contract interest at fixed rates (usually 5%) on their capital.

The Government also undertook to receive all receipts and pay all disbursements of the Companies in India in rupees, accounting to the companies in sterling at the following rates of exchange :

Oudh and Rohilkhand Railway ...	2*s.*	per Rupee.
South Indian Railway	1*s.* 11*d.*	„ „
All the Rest	1*s.* 10*d.*	„ „

The loss to the Government on account of the actual and contract rates of exchange was considerable.

As the Government guaranteed to pay 5 per cent. fixed rate of interest on the capital outlay the incentive to economise in capital outlay and expenditure was taken away.

These terms of the old contracts proved to be onerous and disadvantageous to the Government, and, therefore the earliest opportunity was taken by the Government to avail themselves of the provisions of the contract, under which the lines could be purchased either by cash payment or by means of annuities terminable after a number of years.

The following railways were accordingly purchased by the Government on the dates mentioned against each :

1.	East Indian Railway	1879
2.	Eastern Bengal Railway	1883
3.	Sindh Punjab & Delhi Railway	1885
4.	Oudh & Rohilkhand Railway	1887
5.	South Indian Railway	1890
6.	Great Indian Peninsula Railway ...	1899
7.	Bombay, Baroda & Central India Railway ...	1905
8.	Madras Railway	1907

The above railways are now the absolute property of the State. The Eastern Bengal Railway (2) and the Sindh Punjab & Delhi Railway (3) (now a part of the North Western Railway) and the Oudh and Rohilkhand Railway (4) are now being worked by direct State Agency, and the rest were entrusted to the working companies, under new contracts, which broadly speaking contained the following terms :

(1) The working Company was to have a small amount of share capital in the concern, on which interest at rates varying from 2 to 3½ per cent. was guaranteed by the Secretary of State, out of the revenues of India.

(2) The working Company was to receive a small share of the surplus profits out of the net revenue (gross revenue less working expenses) and after meeting all payments for interest on capital, annual annuities in redemption of capital, payments of interest on annuity. Such shares of the surplus profits were based on some fixed proportion or on the amount of capital contributed by the Government and the company respectively.

The proportion of surplus profits payable to the Companies was as follows :

Assam-Bengal—In the ratio of respective amounts of capital expended by Government and the Company.

Bengal-Nagpur—In the ratio of the average amounts, during the year, of the Secretary of State's Open Line capital and the Company's Open Line capital.

Bombay, Baroda and Central India—In proportion to the average amounts of the Secretary of State's capital (preferred and deferred) and the Company's preferred capital.

Burma—In the ratio of Government and Company's capital which for the purpose of the division of surplus profits was stated at £5,750,000 and £3,000,000, respectively and worked out to $\frac{2}{3}\frac{3}{5}$ths to the former and $\frac{1}{3}\frac{2}{5}$ths to the latter.

East Indian (under the 1880) Contract—Of the first Rs. 25,00,000 of surplus profits, one-fifth, and of any excess beyond Rs. 25,00,000, one-fifteenth.

Great Indian Peninsula—One-twentieth.

Madras and Southern Mahratta—In proportion to the share of capital contributed by each.

South Indian—In the ratio of the average amounts of capital contributed by Government and the Company.

(3) All transactions were to be taken at the actual rate of exchange of 1*s.* 4*d.* to the Rupee.

These conditions will show that control on the part of the Government on the operations of the company was essential. The Government on the one hand was interested in seeing that property of the railway was kept in repair and in good condition and that all fresh capital proposed to be spent was profitably and economically spent, the Company were, on the other hand, were chiefly interested in making the most of the railway as a dividend-earning concern during the term of their contract.

In making the purchases of railways a payment of 25 per cent. premium was made over and above the share capital of each railway company. When the E. I. Ry. was purchased by the Indian Government in 1879 they paid to the Company over and above the capital of £26,200,000 a sum of £6,550,000 in the way of premium which at Rs. 10 to a £ (sterling) amounted to over 6½ crores of rupees.

On the G. I. P. Ry., which was purchased in 1899, the capital jumped at once from £286,549,756 in 1889 to £422,773,327 in 1900, mainly owing to the inclusion of £122,441,611 for premium paid for the purchase of the line by the Government over and above the payment of share capital.

This is how the capital expenditure on Indian Railways was very heavy owing to inclusion of large sums spent in non-productive expenditure.

After the railways were purchased by the Government the Government undertook to provide all the capital and the Railway nett receipts (after payment of all expenses and all interest charges, etc.) were credited to the general revenues of India.

Expenditure on open line capital work is controlled by the Secretary of State, the powers of the Government of India being limited—at one time, about 8 or 9 years ago, it used to be 20 lakhs of rupees for each work or each group of work. The Government of India was, however, empowered to sanction to the extent of 10 per cent. excess in each case, in respect of open line works, and for new lines an excess up to 25 per cent. was allowed to be sanctioned by the Government of India provided that no excess over a revised estimate sanctioned for capital works by the Secretary of State could be sanctioned by the Government of India.

In regard to allocation of funds between Capital and Revenue accounts the principle laid down was that the capital account was to bear the cost of new works, of additional rolling stock, plant machinery, and substantial improvements or of additions to old works, rolling stock, plant or machinery, including the cost of any temporary new work, the construction of which was necessary for the construction of a work chargeable

to the capital, all repairs and renewals being generally charged to the Revenue Account. The allocation in detail is carried on the following lines.

The expense of an additional length of railway, or the doubling of an existing line, the original construction of any work, including that of those intended to be only temporary, as well as of all additions to existing works is charged to capital account.

When new lines from a junction with an existing railway, the expense of the junction and all its accompanying appliances of stations, sidings, signals, etc., is chargeable to capital account.

The cost of additional stations and of any important building not previously contemplated, which is added to an existing station, is charged to capital account.

The cost of maintaining in a proper condition the works, when completed, is charged to the revenue account; but if any extraordinary casualty should occur, such as the destruction of a bridge by flood, the case is regarded as exceptional, and the cost of construction or replacement is charged to capital or revenue, or divided between them, as may be deemed proper, according to the circumstances of the case.

In relaying rails, if the original rails have proved too light, and additional strength in weight of rails is required, the capital account has to bear the difference between the cost of the new and improved rails, and that of replacing the old rails by rails of similar character, revenue being chargeable for relaying and all other expenses. The same principle is applied to replacing by iron sleepers those of wood originally laid down. The proportionate increase on the weight basis or the difference in cost, whichever is less, is under existing rules charged to Capital.

In the case of locomotive and stock, capital bears the first expense of any addition which may be made to the existing stock, and of any important improvement or alteration which may be made in the same, as well as of all machinery which is absolutely new, and not merely in replacement of old; but all repairs and less important alterations of the existing stock of engines, carriages, or wagons already paid for and handed over for working purposes is charged to revenue. The rolling stock and plant, after being once paid for from capital, is kept up by revenue to its full complement.

The figures of distribution of capital between the B. B. & C. I. Ry. Co., and Government were given in one of my previous

lectures shewing the predominance of the Government share.—It may be useful to give another illustration—say of the G. I. P. Railway.

In a statement submitted by the G. I. P. Railway before the Acworth Railway Committee, the Agent of that Railway showed that of about 69 crores of total capital expenditure 65½ crores approximately was that of the Government, the company's share being 3½ crores or thereabouts as follows :

	G.I.P.R.	I.M.R. (Part of G.I.P. Ry.)	Total.
31-12-1900 ...	28,37,81,554	10,31,35,002	38,69,16,556
31-12-1910 ...	38,70,57,310	12,42,18,805	51,12,76,135
31-3-1920 ...	(for the undertaking)		68,92,90,236

G. I. P. Railway Company's Share Capital	...	£2,575,000
(Govt.) Secretary of State's Capital	...	Rs. 65½ crores approximately
Debenture Stock	...	£3,500,000

These figures speak for themselves. The stake of the Govt. of India in the Indian Railways is very considerable compared to the small holdings of the working companies, on which holdings again the companies receive a fixed rate of interest, whether it is earned or not, and a share of the surplus profits, and the two combined, raise the total dividend in some cases to 6 per cent. or thereabouts.

Therefore the Government is required to keep a close check and supervision

(*a*) to ensure the proper upkeep and maintenance of the railway so that the property is received back by the Government in good condition. This supervision is exercised by the Govt. Inspectors, who are Engineers ;

(*b*) to see that all fresh capital is economically and usefully spent ;

(*c*) to see the proper allocation of funds to capital for improvements and to revenue for upkeep and maintenance ;

(*d*) to verify the accuracy of the accounts and of the division of profits.

The check and supervision under (*b*), (*c*) and (*d*) is exercised by the Govt. Examiner of Accounts.

Next to come to branch lines, built out of rupee capital raised by Indian companies :

Such companies are formed for the construction of small branches or feeders to existing systems by which they are usually worked.

5. The main financial conditions of the contracts with such companies were :

(1) The provision of land free of cost to the companies by Government.

(2) Financial assistance either in the shape of a firm guarantee of 3½ per cent. on the Capital, or a rebate out of the net receipts of the parent system sufficient to make up, with the net earnings of the branch, an amount equivalent to 5 per cent. on the capital. But in future the guarantee is going to be 6 per cent. instead of 3½ per cent.

(3) Surplus profits over and above 5 per cent. on the Capital was divided equally between Government and the Branch Line Company, but in future the surplus profits are to be divided over and above 7½ per cent.

(4) The line, if of the same gauge as the parent system, is worked for the same percentage as obtains on the entire system subject to a maximum of 50 per cent. of its gross receipts and in other cases on terms to be agreed upon.

(5) Government to have the option of purchase after the contract has been in operation for 30 years, and thereafter at intervals of 10 years, on payment of 25 times the average net earnings (exclusive of rebate or guarantee) during the 3 years preceding the date of purchase, subject to a maximum of 120 per cent. and a minimum of 100 per cent. of the actual Capital expenditure.

The audit control exercised by Government over the transactions of these Branch Lines Companies, is not so stringent as in the case of the large companies working State Railways. Thus only a periodical test-audit is made of the accounts of such companies. These are not certified to by a Government Examiner of Accounts in the ordinary way. Estimates for all Capital expenditure are required, however, to be submitted for the sanction of the Railway Board in view of the Government's interest in the purchase price.

There is yet another class of railway which is financially independent of Government ; that is, the Secretary of State is in no way concerned with the supply of funds and receives no share of the profits. For example, the Bengal North-Western Railway. The main feature of this class of railway is that the expenditure and receipts both Capital and Revenue are not

included in the Railway Budget of the Government of India, each company making its own arrangements for the supply of funds. The control exercised by Government over such lines is not as strict as that exercised in the case of lines in which Government is a partner interested in a share of the profits. The Government is in no way interested in the profits of such companies except for the period on which the purchase price is to be based.

It must, however, be always said to the credit of Indian State Railways, worked by companies, that the companies have kept the property generally in very good condition and have always asked for more money for repairs, additions and renewals, but money for substantial replacements, improvements and additions on open lines have come from "grants" and been debited to "Capital," and the point is whether or not most of such money should come from Revenue.

INDIAN RAILWAY ECONOMIC SERIES

V

Railway Rates

Under ordinary circumstances, when a railway is not pressed to carry traffic more than its capacity, *i.e.*, it is in a position to carry more traffic, it is the business of the railway to get as much traffic as it can carry at profitable rates, when such a railway is run as a commercial concern, *i.e.*, either to earn money for the private investors or for the public treasury. The carrying of traffic and the earning of profit must be the two objects combined with efficiency.

In any case, it is necessary to see from the very start that the railway construction is not carried on extravagantly and after the railway is made it is necessary to see that the railway working expenditure is not superfluous and also that the railway is getting as much traffic as it can carry with a margin of profit (but without charging unreasonable rates or showing undue preference to any particular trader or particular class of traders or community to the detriment of others) and that the railway is not lowering its rates or causing the rates of other railways to be lowered by entering into unnecessary competition. This latter is an important factor on Indian railways because any unnecessary loss of railway revenue owing to any undue or unhealthy competition is loss of public revenue. At the same time in the interests of public service and of the railway property the upkeep and maintenance of a railway should be well looked after and the property improved and renewed, whenever necessary. As I have already said, in order to safeguard the interests of the public so that unreasonable rates are not charged, maximum rates have been fixed by the Government for each class of goods and also in order to prevent unnecessary loss of revenue, that may be caused by wasteful competition, the Government have also fixed the minimum rates, below which the railways cannot lower their rates.

The history of maximum and minimum rates has been fully given in my Monograph on Indian Railway Rates, on pages 262 to 273 and also in Chapters I and II. For the sake of easy reference and to help the discussion to-day I would again quote the following general circular:

"In March, 1883, the Government enunciated the general principles on which rates and fares should be fixed (*vide*

Circular No. 162 R.T., dated 2nd March, 1883). Briefly the principles laid down were:

(1) That the management should principally aim at attracting the maximum quantity of traffic the line could carry at reasonably low rates.

(2) That all rates, though capable of classification into groups, should be considered as "Special" and be fixed with due regard to

(*a*) what the article would bear,
(*b*) the quantity obtainable.

(3) That the rates might vary between limits represented by

(*a*) the cost of carriage,
(*b*) the tax which the trade will bear.

(4) That the whole circumstances of traffic as regards empty running, intermittent nature of traffic and the effect of competition by other routes, should be considered.

(5) That in the case of competition, the principle of rate calculation should be materially altered. While such factors as capital cost, gradients, cost of fuel and carrying power, should be duly taken into account, the rates must ultimately be governed by the necessity for attracting traffic and not by any arbitrary standard of profit.

It is necessary to give a few words of explanation on this circular.

The first and foremost point is that a railway is to aim at getting the maximum of traffic it can carry. In this connection it is necessary that a railway should get adequate supply of rolling stock and provide facilities to get full use of this stock, for which purpose it is equally essential that the rates should be so fixed as to bring this stock constantly into use. It is also further essential that empty running of vehicles should be avoided, as far as possible, but this is not practicable in all cases.

Both over- and under-supply of waggons and facilities should be avoided. Both have the tendency to raise rates. For instance, if too many trucks are provided charges must be increased to cover the cost (at least the interest on capital spent) on those unemployed. If too few trucks are provided the rates are increased to check the flow of traffic and to make the best out of the traffic which the railway can carry, so as to compensate the railway for not being able to carry the traffic offering but the latter policy, if carried too far, must reduce the railway earnings by diminishing the traffic.

As already said, it is not possible to prevent empty running in all cases, for instance on the G. I. P. Ry. by far the largest quantity of the traffic is in one direction, *viz.*, to Bombay, such as

(1) Cotton from Khandesh, the Berars and the Central Provinces for the Bombay mills and also for export.

(2) Grain and oil-seeds from the U. P., Central India, Central Provinces, the Deccan to Bombay, for local consumption and for export.

(3) Coal from Bengal and Behar, and manganese ore from the C. P. to Bombay for export.

Compared with the large volume of traffic to Bombay the traffic from Bombay is very small.

In the case of the E.I. Ry. there is also large empty running of waggons from say beyond Allahabad to the Coal Districts. At one time the East Indian Railway applied to the Government for a special low minimum rate for grain and oil-seeds from U.P. to Calcutta, in order to fill up their empty wagons and to divert traffic from the western ports of Bombay and Karachee, but this was not allowed because it was found that transfer of traffic to Calcutta would mean loss of revenue to the western lines, and consequently to the Government. Although the E. I. Ry. could carry this traffic at a cheaper cost because of its lower working expenses, it was not allowed to do so. So in this case the lower cost on a particular railway was not taken as a factor in granting special low minimum rates on that railway for reasons fully given in pages 263 to 272 of the Monograph on Indian Railway Rates. If the E. I. Ry. was owned by a private company and the Government had not had any financial interest in this and other railways there would have been no harm in allowing the E. I. Ry. to carry this traffic at such low rates as they could afford, but this is not so in India, and with large Government financial stake in the railways the interests of India and of the Indian railways as a whole ought to be taken into account.

Next to come to the question of the rate to be based on the principle of what the traffic will bear.

The definition of the term 'what the traffic will bear' is very elastic and can be given different meanings by different interests. The railways can give it one interpretation while the users of the railways can give it another. This point has been dealt with by Mr. Hugh Munro Ross in his book "British Railways" in which he says as follows: (I have also quoted the following on page *i* of my Monograph under General Remarks).

"One way, the obvious but short-sighted and ineffectual way of doing this is to charge the highest possible rates and be

content with the limited amount of business that can struggle to exist in such conditions : that is really the principle of charging what traffic will not bear. The other way recognises that a small profit, many times repeated, is better than a large one obtained only occasionally, and that a large business affords greater opportunities of gain than a small and restricted one. Hence it means that a railway accommodates its charges to the circumstances of the traffic and encourages new customers and new traffic by moderate rates and liberal treatment. This is the ideal pointed to by the principle of charging what the traffic will bear." What the traffic will bear is a difficult problem to solve. With the low price of a commodity carried for long distances the freight may begin to tell on the movement of traffic, when the freight charged for transportation bears a high percentage to the total cost of the goods, and minimises the margin of profit, and thus increases the cost of goods at the consuming centre. Therefore such rates restrict the movement of traffic.

In this connection it would be best to give concrete examples. In my last lecture on railway rates I drew your attention to such cases quoted on pages 20, 21, and 22 of my Monograph (Chapter 1). I would like to give you another specific instance. The G. I. P. Ry. rates were rather high before November 1898 ; the public and the Government were complaining about it but the railway company did not move in the matter. Then a change in the administration of the Traffic Department came and one of the recognised rate experts of India became the General Traffic Manager of that line and he made wholesale reductions in rates for traffic for distances beyond which movement of traffic was not large. The result was seen very soon ; there were improvements in the earnings, in the weight of traffic and in net profit and the cost of haulage, *i.e.*, the working expenses became lower. The results were summarised on page 106 of the Monograph on Indian Railway Rates as follows :

(1) There was a distinct advance in the traffic.

(2) The reductions helped to develop long-distance traffic in addition to increasing the traffic generally ; within two years the increase in weight was 25 per cent. and the average lead went up from 221 to 240 miles.

(3) With the increase in traffic the cost of hauling one ton one mile went down.

(4) The net earnings, even in 1899 (*i.e.*, in the first year of the reduced rates), were higher than those of 1896 (which had an average rate of 9·21 pies per ton mile against 7·50 pie per ton mile in 1899).

(5) In 1899 the increased traffic at low rates paid a dividend on a larger capital (which had risen from £279,029,173 in

1896 to £285,549,756 in 1899 on the purchase of the railway by the Government because of payment 25 per cent. premium over and above the share capital) almost as good a dividend as earned in 1896 on a much lower capital and with high rates (*viz.*, 5·48 per cent. in 1899 against 5·52 per cent. in 1896 or the difference against 1899 was ·04 per cent., practically insignificant). Without the low rates and bigger traffic the dividend in 1899 would have been much less. But when the market fluctuations are heavy reduction in rate may mean simply throwing away revenue, *e.g.*, where the fluctuation in prices may be Rs. 2 to 3 per maund any reduction even to the extent of 8 annas per maund will not make any appreciable difference in the volume of traffic carried, *i.e.*, it will not increase the traffic by cheapening the price and the reduction will go into the pockets of middle men. (Refer for such a case on page 129 of my Monograph.)

Loosely packed or naturally bulky goods, which occupy a lot of space but do not give the railways a good paying load or weight to carry, or occasional or irregular despatches of goods, or goods that require special care in handling have naturally got to pay a higher rate because they do not bring to the railway as much revenue as regular, concentrated traffic does, but in some cases things other than these factors have got to be taken into account. Kuppas (cotton with seed) and loose cotton do not give good loads, but they undoubtedly assist the railways to get further traffic in pressed cotton, cotton seed and cotton cloth, etc. Similarly empty boxes or drums are bulky but they help to bring good paying loads in another direction and without them it would not be convenient to despatch some of the good paying traffic by rail. So that each case would have to be dealt with on its own merits.

The railways have got several classes, under which goods are placed and for each class there is a certain mileage rate per mile, and each class is again governed by maximum and minimum rates.

Formerly, there were six classes and following were the maximum and minimum rates :

	Pies per maund per mile.	
Class.	Maximum.	Minimum.
1st Class	$\frac{1}{3}$ ...	$\frac{1}{10}$
2nd Class	$\frac{1}{2}$ ...	$\frac{1}{6}$
3rd Class	$\frac{5}{6}$ ...	$\frac{1}{6}$
4th Class	$\frac{5}{6}$ ...	$\frac{1}{6}$
5th Class	1 ...	$\frac{1}{6}$
X Class	$1\frac{1}{2}$ ...	$\frac{1}{6}$

Now-a-days there are 10 classes and the following are the maximum and minimum rates :

Class.	Pies per maund per mile.	
	Maximum.	Minimum.
1st Class ...	... ·38	... ·100
2nd Class ...	... ·42	
3rd Class ...	... ·58	... ·166
4th Class ...	... ·62	
5th Class ...	... ·77	
6th Class ...	... ·83	
7th Class ...	... ·96	
8th Class ...	... 1·04	
9th Class ...	... 1·25	
10th Class ...	... 1·87	

The maximum and minimum rates for coal in full wagon loads were lower, *vide* pages 261 and 262 of the Monograph but coal rates have since been enhanced.

The revision of the rates and classes has been made with effect from 1st April, 1922 in order to meet the increased railway expenditure, *i.e.*, to earn more money but it remains to be seen whether this end will be attained.

INDIAN RAILWAY ECONOMIC SERIES

VI

Railway Rates, Goods Classification, Scale and Special Rates

Next to refer briefly to "goods classification."

The classification of goods depends upon various factors, such as the following :

(1) Value of goods.

(2) The proportion of weight and bulk to volume.

(3) The continuity of traffic.

(4) The load it gives to the railway wagons in proportion to its capacity.

(5) The amount of care necessary in handling.

Generally the lesser the value and greater the volume and concentrated load the lower the rate or classification.

Minerals and agricultural productions come into the lowest class, and as the value increases and the volume decreases the classification becomes higher.

For instance, wheat, rice, oil seeds, come under the 1st (or the lowest class); wheat flour under 2nd class (formerly, *i.e.*, before April, 1922, it came under 1st class). Formerly sugar and "Goor" were charged 1st class, but both now have to pay 2nd class rates. Fresh fruits, such as are carried by goods trains, used, previous to April, 1922, to be classified 2nd class, but are now placed under 3rd class. Oil was previously classified 2nd class when carried at Railway risk and first class when carried at owner's risk, but the new classification is 4th class at Railway risk and 2nd class at owner's risk. Oil seeds however remain to be charged 1st class. You all know that one of the complaints made before the Indian Industrial Commission was that the export of oil seeds from the producing centres in India was

(1) impoverishing India, particularly the seed-producing centres, to the extent of the fertilizing value of the seeds and in cattle food in the way of loss of oil cakes;

(2) depriving the local labourers and the local capitalists of the profit of manufacturing seeds into oil;

(3) encouraged by railway rates being lower for oil seeds and higher for oil, which not only helped export of seeds out of

India but also assisted in oil mills being centralised at the port towns, which enjoyed the benefit of low rates for oil seeds.

The countries in Europe that take our oil seeds penalise the imports of oil from India by heavy duties in order to take and utilise our raw materials in the shape of oil seeds. Therefore, although on the principle that oil seeds per maund are valued less than a maund of oil, and on the ground that the railways can get better wagon loads by carrying oil seeds than oil in tins, lower railway rates on oil seeds and higher rates for oil may be justified, it is questionable whether in the interests of economic and industrial development of the interior of India the above described method of charging oil seeds and oil rates is good for India.

Ghee, which was classified 3rd class before is now classified 6th class or the enhancement in the classified rate has been 26 per cent.

The rate of sulphuric acid has been raised from 4th class to 8th class. In this case the increase has been 21 per cent. In the enquiry of the Industrial Commission, it was noted that this commodity required cheap rates, and not very long ago Sir Thomas Holland laid stress on the point that for the industrial development of India sulphuric acid should be manufactured and sold cheap, as many other acids are made from this acid and its use commercially is very important and should be extensive.

Sulphuric acid and art pottery are charged the same rates. Generally speaking where the classification has been raised all the goods under that class has been transferred to the higher class, but in some places changes have been made. From the examples that have been and will be placed before you, it may be observed that the value of the goods has not always been taken into account in fixing the classification. Where the classes are but 10 and the number of commodities run into 1,500 or over it is difficult to group them very logically. And some of the differences are striking. Machinery, betelnuts, brass utensils as well as brass ingots and slabs, from which the utensils are made, chillies, all come under 4th class, whereas betel leaves are charged 6th class. Similarly mill stores (such as oil, grease, small parts of machinery, chemicals, leather), glass plates and silk have been classified together, *viz.*, 8th class. Whereas the principle of charging low rates for cheap and large volumes of traffic has been carried out fairly well in the case of agricultural production and minerals and goods in first stage of manufacture, it is not so well carried out in the case of the others. In some cases, a higher classification is charged on account of high price, such as silk goods, and glass plates are charged the same as silk

because of high price and of care and risk attendant to the carrying of glass. In this connection I will quote, from an American publication, some valuable remarks on goods classifications in my lecture on Railway Statistics.

It will however be too early to make any observations on the revised classification of goods or on the enhanced rates and fares until they have been tried for at least a year or 18 months; but in this connection it ought to be borne in mind that any increase in the rates for coal for Indian Railways will have the effect of further increasing the railway working expenses, and thus the cost of carriage on other Indian Railways besides the coal-carrying lines (E. I. R. and B. N. R.), must go up, tending towards further increase in rates particularly on Western and Southern Railways, far off from the Bengal and Behar coal fields. Therefore, the Government ought to consider whether rates on railway coal should be high.

Besides the increase in the class rates there are other rates, which have also been revised and increased, *viz.*, the scale rates and the special rates. I will next explain these classes of rates.

Most of the traffic of the Indian railways was carried in the past at special rates. The G. I. P. Ry. Agent in his evidence before the Railway Committee said that about 75% of its traffic in one direction and more than 50% of its traffic in another direction was carried at special rates, *i.e.*, at rates lower than the maximum rate of each class but higher than the minimum rate for that class.

Scale Rate.

First of all, let me tell you what is a scale rate. You have already been told that there is a maximum rate and a minimum rate for each class, and the scale rate is a rate, within these limits. Now it would be open to a railway to fix a scale on the following basis for goods, for which the maximum may be say $\frac{1}{3}$ pie and the minimum $\frac{1}{10}$ pie per maund per mile; say for grain, at $\frac{1}{8}$th pie for all distances up to 100 miles, $\frac{1}{6}$th pie for all distances beyond 100 miles and so on.

Now this scale again could be manipulated in two ways, *viz.*, on cumulative basis or on a sliding basis. The difference between the sliding and cumulative scales is this. Under the latter the lowest rate for the longer distance traffic applies on such traffic on entire distance from start to finish. But under the former or the cumulative basis the rate for the shorter distance is on a higher scale and is the same for both long and short distance traffic up to a certain distance, and it is for the distances in excess that the charges are on a lower basis, and the higher and the lower rates are added together to form the

rate for the entire distance on the long haul traffic, under the cumulative basis.

Under the sliding basis at the scale of

$\frac{1}{5}$ pie per maund per mile up to 100 miles ;
$\frac{1}{6}$ pie per maund per mile for more than 100 miles ;

the charge for say 90 miles at $\frac{1}{5}$ pie per maund per mile would be 18 pies, whereas the rate for 103 miles at $\frac{1}{6}$ pie would be 17 pies or the charge for the greater distance would be lower than for the shorter distance, but in such cases under the application of differential rule (which requires that the charge for the lower distance should not be higher than for the greater distance, the lower being included in the greater or in other words the charge for the part should not be greater than for the whole) the rate for all distances from 90 to 103 miles would be made 17 pies and not 18 pies.

But under the cumulative basis the rate for 90 miles would be 18 pies at $\frac{1}{5}$th pie per maund per mile and the rate for 103 miles would be as follows :

From 1 to 100 miles at $\frac{1}{5}$th	...	20 pies
For 3 additional miles at $\frac{1}{6}$th	...	1 pie (in a round figure)
103 miles	... ...	21 pies

Such rates, within the maximum and minimum, varying according to distances are called scale rates and they are either sliding or cumulative. Whereas the sliding scale is very elastic and useful in helping to develop traffic for long distances the cumulative basis scale prevents any undue loss on short *distance* traffic, which may already be existing and may not require a lower rate.

Special Rates.

Now we will deal with special lump sum or rather the exceptional station to station rates. These rates are by the name given to them " special or exceptional " rates introduced to meet special circumstances, such as to encourage new traffic, to help industries, to meet river competition, railway competition, road competition, competition between railways serving several ports and competition between markets.

The special rates may sometimes appear arbitrary, but generally each rate or each group of rates is governed by special conditions.

A new industry may be built, and it may require special rates for its machinery, plant and for its raw materials and sometimes for its finished products as well.

There may be river competition, such as was and there is (even now up to the present time), during the rains for traffic between Calcutta and say Patna. The steamer freight may be lower for a particular class of traffic than the railway freight at the maximum mileage rate for the class, under which the traffic in question is placed in the Railway Goods Classification ; say the class rate at its maximum may be $\frac{1}{3}$ pie and in order to compete with the river route it may be necessary to quote at $\frac{1}{7}$th pie. Thus the mileage rate say $\frac{1}{3}$rd pie from Patna to Calcutta may be 113 pies for 338 miles and the steamer rate may be 36 pies only, so that a special rate may be quoted at say 47 pies at $\frac{1}{7}$th pie because the steamer rate is say 36 pies. But at the same time for similar traffic from Madhupur to Calcutta, only 183 miles, the rate may be 61 pies under the ordinary class rate or $\frac{1}{3}$ pie and this rate for Madhupur traffic (where there is no competition) does not require any reduction by itself, but a question may arise that the charge for the lower distance is greater than for the longer. Some railways apply the principle of differential rule and make the rate for the shorter distance the same in total as that for the longer, *i.e.*, the Madhupur rate would also be 47 pies, but other railways do not do this. The latter would say that such an action is uncalled for by the circumstances of the case and means unnecessary sacrifice of revenue, whereas the former recognise that on the principle of equity the rates should be lowered. A very interesting case of rates for shorter distances being higher than for the lower distances was fully stated and argued both from the public and the railway points of view on pages 321 to 324 of my monograph on railway rates. There are various other kinds of competition. I should also like to draw your attention to a case of port competition and to the following remarks on pages 305 and 306 of the Monograph :

" The ruling prices at the ports combined with the railway freights generally decide the flow of traffic. Taking the month of March and with the price ruling at Cawnpore at Rs. 3-12-0, it was not possible for either Calcutta or Bombay to do any business except such business which had already been transacted and contracted for under the forward sale system. The prices quoted at these ports were Rs. 3-15-0 and Rs. 4-2-0, whereas with the railway freight of Rs. 0-5-3 to Calcutta and Rs. 0-7-0 to Bombay, the total cost of the Cawnpore production would be Rs. 4-1-3 at Calcutta and Rs. 4-3-0 at Bombay. Such prices cannot hold on and the price came down in April to Rs.3-8-0 at Cawnpore and with Calcutta price at Rs. 3-15-0 and the Bombay price at Rs. 4-2-0, the latter port would command the traffic as the margin of profit would be greater in the case of

Bombay buyers even with higher Railway freight to that port thus :

		Rs.	A.	P.
Cost at Cawnpore	...	3	8	0
Railway freight to Bombay	...	0	7	0
		3	15	0
Bombay Quotation	...	4	2	0
Margin of difference	...	0	3	0
Cost at Cawnpore	...	3	8	0
Railway freight to Calcutta	...	0	5	3
TOTAL	...	3	13	3
Price in Calcutta	...	3	15	0
Margin of difference	...	0	1	9

Again the prices at the ports are regulated by the Steamer freights. For instance, before the war.

Taking the average difference at £0-7-0 or 84 annas per ton or annas 84÷27 maunds between the Calcutta and the Bombay steamer freights, the difference per maund came to, say, three and half annas and thus Bombay was able to offer a better price than Calcutta."

Now in this case, it was argued by the East Indian Railway that as their average cost of carrying traffic was 50% lower than that of the G. I. P. Ry. the E. I. Ry. minimum rate from Cawnpore to Calcutta should be 0-3-6 (at $\frac{1}{16}$th pie per maund per mile) instead of 0-5-3 (at $\frac{1}{10}$th pie per maund per mile) on which latter basis also the G. I. P. Ry. rate of 0-7-0 to Bombay was fixed or in other words the E. I. Ry. claimed that their minimum rate should be $\frac{1}{16}$th pie, which was near their average cost of working, and that the G. I. P. Ry. minimum should remain at $\frac{1}{10}$th pie, which was very near the G. I. P. average cost of carrying the traffic. If this would have been allowed the E. I. Ry. by reducing their rate from 0-5-3 to 0-3-6 or by 0-1-9 per maund could have raised its margin of difference from 0-1-9 (for Cawnpore wheat) to 0-3-6 in favour of the Calcutta market and thus been in a better position to compete with Bombay port. So that if the E. I. Ry. had been allowed to have its minimum at $\frac{1}{16}$th pie, based on the average cost it would have perhaps carried the traffic, but the Government did not allow this for reasons already stated.

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VII

Long and Short-haul Traffic Rates

As regards long and short-haul traffic, the general idea is that long distance traffic pays a railway better than short distance traffic.

In this connection I would invite your attention to chapter VIII, pages 273-275 of the Monograph. I also draw your attention to the examples 1 to 3 on pages 273 to 275.

It is generally held that it pays a railway to carry full wagon load traffic for long distances at a cheaper rate per mile than traffic for short distances.

Where however, as in India, the leads are very long it is not always so.

Taking the cost of maintaining the permanant-way, stations, yards, buildings, and the staff at stations, etc., at a fixed figure and the supervision and general charges as constant, and repairs to rolling stock at so much per so many miles run and the running expenses per hour or per day, it is apparent that more a wagon earns per day or per year the better it is able to add to the earnings and profits of a railway.

It is correct that in the case of very short distance traffic the earning is not so good as in the case of long distance traffic (say 50 miles compared with 350), but compared with 633 miles the earning per day per wagon is better in the case of 125 miles, *vide* examples (*a*) and (*b*) towards the end of page 275 of the Monograph.

But I would like to give you still clearer examples :

When the traffic is constant and regular, *i.e.*, wagons can get traffic as soon as they are returned back for loading, and the traffic is between certain specific points, and the conditions are the same (*i.e.*, for instance there is empty running in one direction) both in the case of long and short hauls it pays to carry comparatively short distance traffic at a higher milege rate than long distance traffic at a lower milege rate.

For 175 miles.

Rate $\frac{1}{8}$th pie per maund per mile × weight carried per wagon 500 mds. × length 170 miles = Rs. 56 (in round figures). 170 miles haulage would mean 4 days in transit (2 days on the outward

journey and 2 days on the return journey) at an average speed of 85 miles per day, plus 2 days (one day for loading and one day for unloading) or 6 days in all. Therefore 365÷6 would give 61 trips in a year. And 61 trips × Rs. 56 per trip would enable each wagon to earn Rs. 3,416 in a year.

For 700 Miles.

Rate $\frac{1}{14}$th pie per maund per mile × weight carried per wagon 500 mds. × miles or the length for which the traffic is carried 700 miles = Rs. 130.

700 miles at 100 miles per day would mean 7 days on the outward or loaded journey and 7 days on the return or empty journey of the wagon or 14 days plus 2 days (one day for loading and one day for unloading) or 16 days. Therefore 365÷16 would give 23 trips. Now 23 trips × Rs. 130 per trip would give each wagon a earning of Rs. 2,990 a year, or Rs. 426 per wagon per year would be more earned in the case of 175 miles which, say on 5,000 wagons a year, means 21 lakhs of rupees.

The rate of $\frac{1}{14}$th pie has been taken for 700 miles as such a rate is permisible on traffic in coal and this example is really intended for coal traffic.

So it will be clear very low rate on long distance is not so good as a reasonably low rate on comparatively short distance traffic. Each case, therefore, has to be considered on its merits and a general principle cannot govern all cases if we take it for granted always that long distance traffic is a better paying traffic than short distance traffic and can afford low rates.

In connection with long and short haul traffic we cannot overlook one point. It is that in India the ownership of all the trunk railways being that of the Government, if a wagon load of traffic is carried over two railways it is practically carried over one system, but this is not recognised on Indian Railways because (1) of separate Company management of each line, (2) and of each railway being worked as an independent line, irrespective of the fact that it may either be a state-worked state line or a company-worked state line.

I have already shewn you what scale rates are, *viz.*, they become lower per unit mile, as the distance increases (say $\frac{1}{6}$th pie per mile for distances up to 100 miles, $\frac{1}{8}$th pie for distances 101 to 200 miles, $\frac{1}{7}$th pie for distances 201 to 300 miles and so on) but in such cases, the lower rate ceases as soon as the haul over one railway is finished and on the next railway (in the case of traffic booked over two railways or more say from Patna on the E. I. Ry. to Bhopal on the G. I. P. Ry.) the higher rate for the first hundred miles or so, starts again on the next railway.

For an illustration of this kind I refer you to page 226 of the Monograph on rates.

The Government of India, at one time, held very strong views on the point that scale rates, becoming low as the distance increased, as may be determined over one railway should, in through booking with other railways be calculated as if goods were carried over one railway system, but this was not carried into effect because of separate company management of the lines. It was however accepted that there was justification for concession to the public of lower rates over long distances and for large quantities and that in the aggregate such rates were sufficiently remunerative, but it was held that in cases where one railway sent large quantities of traffic to a foreign line it was loss to the railway, on which the traffic originated, to accept low rates per mile for short distances. And thus in spite of practically one ownership of the trunk lines of India and although the Government share of the Railway earnings on the whole would not be affected in any way, the public did not get the advantage of low rates for through distances because of individual management of each railway in its own individual and particular interests irrespective of the interests of all railways, the Government and the public taken together, except in the case of coal. When the railways can carry more traffic and have sufficient wagons then in that case long distance traffic to earn whatever more money the railways can get is worth being encouraged by low rates.

INDIAN RAILWAY ECONOMIC SERIES

VIII

Railway Statistics

Although the Indian Railways have not the same elaborate statistics as the American Railways have the Indian Railways have better statistics than the English Railways, but while the American Railway statistics are always fresh, the Indian Railway statistics are stale; the latter when published in their full details, are for periods a year or 18 months older and are not for each section of a line but for the whole length and as such as they lose their value in the matter of utility in statistics being used to improve matters, to detect mistakes or defects and to apply remedies. It is true that even stale statistics have their utility, but if each District Officer has before him statistics of his District relating to a period, not older than a few weeks, and in their fullest detail, he would be in a better position to know where to direct attention and to endeavour for improvements.

In the first place, there are the train mile statistics. The train mile figures are obtained by multiplying the total number of trains by the number of miles run. The total train miles, the up and down train miles, the passenger and goods train miles can also be separately shown, and it is also easy to show the Up and Down train miles for different lengths of a line. And the total earnings from passengers divided by the total number of passenger train miles give the earnings per passenger train mile, and similarly the total goods earnings divided by the total goods train miles give the earnings per goods train mile.

The vehicle miles are more troublesome to be got out than the train miles. But the vehicle mile statistics are kept by Indian Railways, showing separately the Up and Down vehicle miles and the empty and the loaded vehicle miles. The vehicle miles are obtained by multiplying the number of vehicles run for the various lengths by the number of miles run by each. Each goods train guard carries with him a vehicle summary, which shows the number of a wagon, the station from and to which it is to be carried, whether loaded or empty, and the weight in each of them, and the card labels on each loaded vehicle also show the informations. Next are the

passenger mile and the ton mile statistics. These can be got out respectively from the record of tickets and the counterparts of Railway receipts (or invoices, which are mere duplicates of Railway receipts) issued, and accuracy can be ensured in respect of these figures. although the work involved in connection therewith is tiresome and heavy, and if the staff issuing the tickets and Railway receipts make it a point to note down the passenger miles and the ton miles as each entry is made they can send and give very fresh returns and these returns can be compiled for each District. The passenger miles are obtained by multiplying the total number of passengers by the total number of miles travelled by them, and the ton miles are worked out by multiplying the total weight of goods carried, by the number of total miles for which all goods have been carried. So that one ton carried 100 miles will be 100 ton miles also 100 tons carried one mile will be also 100 ton miles.

The receipts per passenger are obtained by dividing the passenger receipts by the number of passengers, and the receipts per mile per passenger by further dividing the receipts per passenger by the number of miles run by a passenger, and the average can be worked out by taking the total number of passengers, the total earnings from passenger traffic and the total number of miles run by them such as the following :

Number of passengers.	Earnings. Rs.		Total number of passenger miles.
2,000	2,000		80,000
Earnings per passenger Re. 1 per mile	(2,000	÷	2,000)
Run per passenger per mile 40 miles	(80,000	÷	2,000)

Earning per passenger Re. 1, *i.e*, 192 pies ÷ 40 miles = $\frac{4}{5}$ pies per mile. The latter is the earning per passenger per mile. Similar figures for goods traffic can also be worked out, the only difference being that instead of number of passengers you take in the case of goods the weight of traffic in tons.

But it may be pointed out that the average of 40 miles or Re. 1 per passenger shown above, does not give any accurate idea of actual work done, for instance, the average of 40 miles might have been arrived at by carrying 1,000 passengers (out of 2,000) for 60 miles, and the balance 1,000 passengers for 20 miles so that it is the component parts that make up the average that are more important and useful than the average itself. And if, therefore, a little more labour is undertaken and expense not grudged, it would be more to the point if the main component parts of the average are published as well.

In connection with Capital account the following information is published in respect of each Railway :

(1) The total capital outlay, under different heads, such as, buildings, workshops, permanent way, rolling stock and sub-heads, such as, station buildings, office buildings, staff quarters, ballast, rails, earthwork, machinery and plant, engines, goods and coaching rolling stock and the details as to number of wagons, engines, carriages, etc., are all available.

Then for the financial year under review for which accounts are published, the expenditure on open lines, on rolling stock and on improvements, renewal and extension of facilities are shewn, as separate from the expenditure on new lines.

As to receipts, the total number of passengers and goods carried, the details of number and earnings of the various classes of passengers, and the weight and earnings of all important commodities carried are shown separately. And the earnings per week per mile are published along with the weekly figures of traffic receipts and expenditure, and total expenses per week per mile; the percentage of working expenses to gross earnings and of net receipts to the capital outlay are also published every year.

Under the head expenses, the total expenses and their proportion to gross earnings and the expenses under the various heads such as the following and the percentages, of expenditure under each head to gross earnings and to total expenses are given :

(1) Maintenance of way and works and stations
(2) Locomotive expenses
(3) Carriage and wagon expenses
(4) Traffic expenses
(5) General charges (including Administrative and Audit and stores supervision expenses) ; and
(6) Miscellaneous expenses, such as contribution to provident fund of the staff, etc., etc.

Then under each main head there are sub-heads such as undermentioned.

Maintenance of Way and Works.

(*a*) General superintendence.
(*b*) Maintenance and renewal of permanent way.
(*c*) Repairs of bridges.
(*d*) Repairs of station buildings, etc., etc.

And all these again are worked out per train mile and per 1,000 gross ton miles.

Locomotive Expenses.

(*a*) General superintendence.
(*b*) Running expenses.
(*c*) Cost of fuel and water.
(*d*) Oil, tallow and other stores.
(*e*) Maintenance and repairs, renewals of locomotives.
(*f*) Maintenance and repairs, renewals of plant and machinery.

And all these are further worked out per engine miles and per 1,000 gross ton miles.

Carriage and Wagon Expenses.

(*a*) General superintendence.
(*b*) Repairs and renewals of passenger vehicles.
(*c*) Repairs and renewals of goods vehicles.
(*d*) Repairs and renewals of machinery, tools and plants.
(*e*) Cleaning and oiling ; and
(*f*) Other charges.

And the cost is also worked per 1,000 vehicle miles run by vehicles owned by the home railway.

Traffic Expenses.

(*a*) General superintendence.
(*b*) Station staff.
(*c*) Train staff (Guards).
(*d*) Stores, water, fuel and lighting.
(*e*) Clothing of the staff.
(*f*) Printing, tickets and stationery.
(*g*) Payments to other lines for the use of their rolling stock and for the use of joint stations.
(*h*) Other charges.

Further, the receipts and expenses are analysed and the figures of analysis of working are published, some of which are as follows :

1. Division of expenditure between coaching and goods traffic. The division is made in ratio of gross ton mileage ; there is a fixed weight taken per passenger for purposes of calculation so that the division is on a weight basis between goods and passenger traffic.

2. Average sum received for carrying each class of passenger per mile.

3. Average sum received for carrying one ton one mile.

4. Average number of passengers of various classes per train. For instance, out of 197 average passengers in a train

there may be 1 first class passenger, 6 second class passengers 10 inter class passengers and 180 third class passengers. This average is arrived at by taking the total number of passengers of each class separately and dividing the total numbers by the number of passenger trains run.

5. Earnings per vehicle per mile. I have already shown that vehicle mileage statistics (both passenger and goods) are published and the vehicle per mile earnings are obtained by dividing the passenger earnings by the total passenger vehicle mileage and the goods earnings by the total goods vehicle mileage.

6. Average cost of hauling a train one mile; and

7. Average cost of hauling a passenger unit or a goods unit one mile.

As we have already seen, the total expenses are divided first between the goods and passenger traffic in ratio of gross ton mileage of each. After this is done, the total passenger and the total goods expenses are divided respectively by the total passenger miles and the total goods ton miles to arrive at the cost of hauling a passenger one mile or a ton of goods one mile.

8. The average number of goods vehicle per train. As I have said, there is a vehicle summary (showing all the vehicles in a train whether loaded or empty and the station booked from and to) made out for each train, and if necessary, fairly accurate statistics can be got out in this respect.

9. Average number of tons in a train.

This is first arrived at by dividing the total goods tonnage by the total number of goods trains.

Then again by separating the empty train mileage from the loaded train mileage and dividing the total tonnage by the total number of loaded trains so as to give the load per loaded train.

10. Average load of a wagon (taking the loaded and the empty together). This can be arrived at by dividing the total tonnage by the number of vehicles used.

11. Average load of a loaded wagon. This can be arrived at by taking the total tonnage and dividing it by the number of vehicles that run loaded in a year as separate from empty vehicles.

12. Average working expenses per goods and coaching train miles are arrived at by dividing the total expenses of goods or coaching by the total number of train miles run for goods or for coaching as the case may be.

13. Average miles run per vehicle per day are arrived at by taking the total vehicle mileage of goods vehicles or of passenger vehicles, as the case may be, and dividing the same by the total number of goods or coaching rolling stock used and

the result thus arrived at is divided again by 365 days, to arrive at the number of miles run per vehicle per day.

There are numerous other items of revenue and expenditure that are annually shown in various ways.

And in the revenue statistics the total traffic in goods and passengers and the earnings therefrom from any station to any station on a railway are shown. These figures are known as station to station traffic figures. They are of great importance to the person dealing with railway rates and the weight and earnings of each station in important commodities (both inward and outward) are also shown, and their movements between important points such as, from the important places in the interior to the ports are also given.

The American Government requires the railways, though they are company-owned, to publish very elaborate statistics, as the Government consider the railways as of national importance to the country and, therefore, hold the view that any information about them is essential to the Inter-state Commerce Commission, which deals with all disputes between the railways and the public in the matter of fairness or unfairness of railway rates, goods classification, etc., and there are published periodically the statistics of railways in the United States, and it is said that "the conditions under which the railroad companies can afford to transport traffic have a large influence in determining the classification" as distinct from the factor of charging on the basis of what the traffic will bear. The Americans hold that it is not unjust to distribute the entire cost of service among all articles carried on a basis that gave greater consideration to the relative value of service than to cost.

It will be interesting to quote the following from an American Government publication in this connection :

"Under the system of apportioning the charges strictly to the cost, some kinds of commerce which have been very useful to the country and have a tendency to bring different sections into more intimate business and social relations could never have amounted to any considerable magnitude, and in some cases could not have existed at all, for the simple reason that the value at the place of delivery would not equal the purchase price with the transportation added. The traffic would thus be precluded, because the charge for carriage would be greater than it could bear. On the other hand, the rates for the carriage of articles which, with small bulk or weight, concentrated great value would, on that system of making them, be absurdly low when compared to the value of the articles, and perhaps not less so when the comparison was with the value of the service in transporting them.

Accordingly, it was found not to be unjust to distribute the entire cost of service among all articles carried on a basis that gave greater consideration to the relative value of the service than to the cost. Such a method would be most beneficial to the country ; it would enlarge commerce, and extend communication, and would be better for the railroads because of the increased traffic which would be brought to them.

The value of the article carried under this system would be the most important element in determining what freight charge it should bear. Other considerations, however, equally important, must not be overlooked when the freight classification is to be made. The classifications as now constructed have for their foundation the following elements :

The competitive element or the rates made necessary by competition.

The volume of the business—that is, the tonnage movement.

The direction in which the freight moves—that is, whether it moves in the direction in which most of the freight is transported or in the reverse direction in which empty cars are running.

The value of the article.

The bulk and weight.

The degree of risk attending transportation.

The facilities required for particular or special shipments.

The conditions attending transportation, such as furnishing special equipment, as in the case of private dressed-beef cars or cars specially adapted for freight of a perishable nature, or cars of large size for freight of extraordinary bulk.

Another condition which has also received consideration is the analogy which the new articles to be classified bear to other articles found in the classification.

The conditions under which railroad companies can afford to transport traffic have a large influence in determining the classification."

It is held that without very minute and detailed statistics the management of very large systems of American Railways would have been difficult. The check and supervision by the higher officers, even by the District Officers, is mainly exercised through statistics, which, some say, are responsible for the great improvements by the American Railroads. Besides the very detailed statistics maintained by the Railways, which are for current periods, *i.e.*, they are not older than by a fortnight or so, the Interstate Commerce Commission publishes statistics from

(1) the financial Balance Sheets of railways
(2) Income and expenditure account
(3) Profit or loss account

(4) Railway Operating Revenues
(5) Railway Operating Expenses.

Some hold that the Indian Railway statistics are of not great use. If so, the right thing will be to improve them and to issue them fresh and not to do away with them. Even old statistics for consecutive years afford opportunities for very useful comparisons, thought, enquiry and improvement in all directions and the value of statistics cannot be overrated. Even the Acworth Committee while complaining of the voluminous nature of statistics kept on Indian Railways had to admit as follows:

"If the railway statistics were adequate and if the members of the Railway Board themselves had leisure to study them, and then apply the results they had ascertained to the case of an administration that was backward in improving the state property entrusted to its management, we are persuaded not only what more traffic could be carried, even with existing facilities, but that the state profits would be largely increased."

I am in entire accord with these remarks. I have dealt with railway rates of different parts of India and was connected with such work directly and indirectly for many years, and I always found statistics most useful in fixing and determining the rates and their results and in getting more revenue for railways by suitable rates where traffic was lacking. In fact, Indian Railways ought to keep for the information of their operative and traffic officials more detailed statistics of traffic movements and earnings and of operative expenses and of wagon movements and loads.

INDIAN RAILWAY ECONOMIC SERIES

IX

Passenger Traffic

The passenger traffic of Indian Railways is divided into four classes, *viz.*:

1st,
2nd,
Intemediate, and
Third.

The maximum fares allowed to be charged formerly used to be

	Pies.
1st class	18
2nd „	9
Inter „	4½
3rd „	3

and the minimum fares were

1st class	12
2nd „	6
Inter „	3
3rd „	1½

On some railways, *e.g.*, on railways in northern India and in Bengal there were all these four classes, but for a number of years the railways in southern India and in Western India had only three classes, 1st, 2nd and the third. Even up to the present there are yet only the three classes on some of the latter. As in the case of goods rates passenger fares were regulated within the maximum and the minimum but competition by reducing passenger fares between railways was discouraged as far as possible.

The railways in northern India and in Bengal generally charged in the case of 1st and 2nd class maximum fares, *viz.*, 18 pies and 9 pies respectively, for the first 150, 200 or 300 miles, and the minimum fares, *viz.*, 12 pies and 6 pies for distances in excess.

Of course distances over each railway were, and are, taken separately, that is, the lower fares over the first 150, 250 or 300 miles did not apply if the distance over one railway was, say, 150 miles and over another 150 miles. If, however,

300 miles were to be travelled over one railway then in such cases the reduced fares over the entire distance applied.

The G. I. P. and B. B. and C. I. Railways for a number of years charged the minimum fares for the 1st and 2nd classes, *viz.*, 12 pies and 6 pies respectively. In the case of third class the fares differed on various railways. The fares varied from 3 pies to 1½ pies per mile according to distances travelled, *viz.*, fares became cheaper for longer distances.

It will be interesting in this connection to see what was the average earning per mile of some of the railways in carrying third class passenger per mile:

	E. I. R.	G. I. P. Ry.	B. B. & C. I. Ry.	Madras Ry.	N. W. Ry.	E. B. Ry.
	Pies per mile.	Pies per mile.	Pies per mile.	Pies per mile.	Pies per mile.	Pies per mile.
1871 ...	3	3	3	3	3	4
1882 ...	3·79	2·48	2·45	3	2·42	2·96
1904 ...	2·44	2·15	2·28	2·23	2·27	2·48
1915 ...	2·22	2·32	2·09	2·18	2·41	2·50

It will be observed that the average earning per mile gradually became lower in later years, but the average was between 2⅛ pies and 2½ pies per mile. In 1920-21 the aggregate sum for carrying each third class passenger was 2·92 pies. It will be more in future because of high fares. There is very large predominance of passengers for short distances. The average lead for which third class passengers travelled on Indian railways did not exceed (taking the aggregate of all the Indian Rilways together) 37 miles.

Taking some of the principal railways we find the following figures for the official year 1914-1915 (1st April, 1914 to end of March, 1915):

I. Railways.	II. No. of third class passengers.	III. Third class passenger, unit miles.	IV. Average miles per passenger.
B. N. Ry. ...	15,409,200	699,916	22
B. B. & C. I. Ry. ...	29,439,500	830,181	35
E. B. S. Ry. ...	26,867,400	400,683	66
E. I. Ry. ...	35,146,000	2,029,061	17
G. I. P. Ry. ...	28,007,000	1,487,306	19
N. W. Ry. ...	59,263,200	2,281,032	26

The figures in Column IV have been arrived at by dividing the figures in Column II by those of Column III. It will be seen that the average distances, for which third class passengers travelled was limited.

The Indian Railway fares are the cheapest, but Mr. Priestly (who was for many years one of the senior Traffic Officials on the B. B. and C. I. Railway, sometime Traffic Manager of the Southern Maharatta and of the E. B. S. Rys. and also Under-Secretary to the Government of India, Railway Department, for a number of years and eventually Agent of the South Indian Railway) held that although the Indian Railway fares were cheap on paper they were really higher than of European countries in effect. He said this in his very able report on American Railways, which was published in 1903. He demonstrated by facts and figures that in America an unskilled labourer could travel 60 miles for one day's wages whereas the same class of inhabitant in India could not travel for more than 14 miles for one day's wages.

The late Mr. (afterwards Sir) T. Robertson, the first special Railway Commissioner for Indian Railways, in his report in 1902 gave his opinion that taking the cost of construction and working of railways in England and comparing them with the cost of construction and working of railways in India the fares in India should be $\frac{1}{8}$th of those in England, and on this basis, he recommended, 20 years ago, that the reduction in the Indian Railway Passenger fares of those days should have been 18 to 40 per cent. ; he also laid great stress on the point that reductions were particularly needed for long distance traffic and also observed that reduced fares should be applied on the total longer distances irrespective of distance travelled over each individual railway.

The figures of traffic, passenger unit miles and the average lead per passenger go to show to a certain extent that in India long-distance travelling has not been very popular inspite of the fact that railways of India extend for long distances as each principal railway traverses several districts, provinces and the lengths from one end of the line to the other extend to 600, 700, 900 miles, and more. It is also obvious that if the higher fares remained for the shorter distances, say up to 60 miles, where the avarage lead is less than 30, and up to 100 miles where the average lead per passenger is less than 50, and up to 120 miles, where the average distance per passenger is under 70, and then if lower fares were charged for distances above these limits, the railway revenue ought not to be affected ; on the other hand, there would be encouragement given for long distance travelling, and the earnings ought to improve.

The percentage of third class passengers to the total number of passengers was very large on Indian Railways.

The average number of passengers in the various classes per train during the 1st half of 1914-15 was as follows :

	First Class.	Second Class.	Inter Class.	Third Class.	Total.
B. N. R. ...	1	3	8	181	193
B. B. & C. I. ...	1	7	13	216	237
E. B. S. R. ...	1	4	22	144	171
E. I. R. ...	1	4	16	207	228
G. I. P. R. ...	1	4	2	147	154
N. W. R. ...	1	3	11	197	212

On the above figures the proportion of third class passengers to the total number of passengers was—

On B. N. R.	...	...	94%
On B. B. & C. I. R.	...	...	91%
On E. B. S. R.	...	...	82%
On E. I. R.	...	...	90%
On G. I. P. R.	...	...	95%
On N. W. R.	...	...	93%

For many years, third class passengers were discouraged from travelling by fast trains. Even now accommodation for third class passengers on mail trains is limited; mail trains on big railways are meant principally for the carriage of first and second class passengers. But during later years on railways like E. I. R., G. I. P. R. and B. B. & C. I. R. fast express trains were introduced and these trains consisted mainly of Third class carriages, and there are one or two inter class carriages, and two first class and two second class compartments. Such express trains may not carry many passengers, who travel for long distances but these generally run full as passengers are continually boarding such trains, for short distances.

Colonel George Huddleston, who was General Traffic Manager of the E. I. R. for many years and was also for some time the Acting Agent of that line, once held the view that such fast express trains should start at intervals of every 6 hours, and should run for as long distances as possible, and that slow passenger trains should run for short distances only, and act as feeders to the fast trains, which do not stop at all stations. His opinion was that slow passenger trains running for long distances meant provision of a larger number of carriages,

because it took longer for the carriages to be turned round, on account of slowness of speed, constant stoppages and long distances.

It was also his opinion that intermediate class could with advantage be abolished, if second class fares were reduced almost to the level of inter class, more second class coupe compartments were provided, and only a few large compartments, and sleeping accommodation were available for the night at a charge of 1 pie or 2 pies per mile extra.

In regard to third class passengers, Colonel Huddleston held the view that if express trains were given stoppages for one hour in the morning, one hour in the noon and for one hour in the evening and for say 30 minutes at midnight and plenty of water taps, bathing enclosures for men and women, and latrines, with proper sanitary arrangements, were provided at these stopping places and arrangements were also made there for supply of fresh and wholesome food for both Hindus and Muhammadans the third class passengers, would be best served, and then the express trains could be run at a greater speed as stoppages at other stations could be curtailed except for railway purposes. My reply to him, 15 years ago, was that such an arrangement would be welcomed by not only third class passengers but by many Indian first and second class passengers, who were not used to European methods of living and did not take European food. Owing to caste system in India, even separate dining cars for Hindus and Muhammadans would not suit in some parts of India. It is true that the N. W. Railway has provided dining cars, but conditions are somewhat different in the districts served by the N. W. Railway to those say in U. P. Behar and Bengal, as orthodox Hindus will not take rice, dal, curry or bread in dining cars. Therefore if refreshment cars or compartments for Hindus are provided and there was no such food as may be called "*Kutcha*" (such as rice, dal, etc.) and no fish or meat, in that case they would be more availed of for supply of fresh cooked "*Pucca food*" such as Poories, vegetables, sweetmeats and milk, etc., and similarly a compartment may also be provided with food suitable to Muhammadans.

But above all, supply of wholesome drinking water is the most important of all, particularly during the summer season, when cold water is very much in demand. It is true water taps have been provided at many stations, and there are on some railways, earthen Gharras containing water for Hindus and Muhammadans kept separate, but at stations, where stoppages are limited, the passengers are put to great inconvenience, because the number of men supplying water is not always adequate; lately I had to travel through Rajputana

just as the rains commenced, and I saw for myself that the rush for water at every station was great, and every one that wanted water did not always get it for a long time.

The types of carriages that are in use on Indian railways are suitable for the requirements of the country provided that overcrowding is prevented, and when the railway fares were first increased one of the objects was to prevent overcrowding owing to limited number of carriages available during the War due to curtailed train service. The fares now-a-days come to about 30 pies per mile for the first, 15 pies for the second class, 7 pies per mile for the intermediate class and 4 to 5 pies per mile for the third class.

The Acworth Committee said that increase in the Railway fares was overdue but their recommendation was mainly based on the idea that even in spite of enhancements the Indian railway fares would yet be cheapest in the world and on the ground of rise in the working expenses of Indian railways.

Whether the increased fares will or will not curtail the passenger earnings of the Indian railways is a matter that requires very careful consideration. When the high fares have been in force for say 1 or 2 years a comparison should be made between the ratio of increase in the number of passengers and in earnings for 4 years prior to 1914-15 and for 2 years after the recent high increase in the fares. If it is seen that number and earnings have dropped or the ratio of increase is much less, it will be reasonable to reduce the fares especially for long distances, but this should be done when the railway facilities to carry increased passengers have been provided or else there will be overcrowding and discomfort.

The first and second class passengers, who happen to be starting from stations, wherefrom the trains start, generally get sleeping berths for the night, for which no extra fares are paid. In a first class compartment, there are 4 sleeping berths and there is a lavatory with all the conveniences including a bathing tub. In a second class compartment, there are 5 sleeping berths and the same conveniences in the lavatory as in the first class, excepting the bathing tub. During the day a first class is supposed to carry 6 passengers and a econd class 12 passengers in a compartment and during night 4 and 5 respectively. In the first class with the 2 additional chair seats 6 passengers can pass the night (4 sleeping and 2 sitting) but in second class if 5 berths have been occupied from the starting station the passengers getting in at intermediate stations have to sit on boxes or on the floor, because even during the night 12 passengers can enter a second class compartment. Therefore, the question is whether more lateral or Coupê

compartments for the second class and less big compartments would not be more suitable in providing accommodation for more second class passengers in the same space on a train. Of course the big compartments are more comfortable and suitable to Indian climate, but considering that the difficulty in getting sleeping berths in the night is getting more acute, it seems coupê compartments would give more sleeping accommodation and will also provide more sitting accommodation during the day.

On most railways there are electric fans and lights, in the first and second classes. It is a question whether during the hot weather "*Khus Khus tatees*" could not be given in addition as they used to be given in the olden days, when there were no electric fans.

The third and the intermediate classes are supposed to supply sitting accommodation only. When, however, the rush is less the passengers can stretch themselves a bit but in these days there are more cases of overcrowding than of half-full compartments.

Referring to the question of cheap fares again, it may be pointed out that the past experience on Indian Railways has been that with every decrease in the fares there were increases both in the number of passengers travelling and in the earnings and in this connection I would invite attention to pages 147 and 148 of my "Monograph on Indian Railway Rates."

INDIAN RAILWAY ECONOMIC SERIES

X

General Results of Working of Indian Railways

I. The total mileage of Indian Railways at the end of 31st March, 1921, was 37,029, out of which

Miles.		
18,195	were broad gauge	... 5′—6″
15,248	were metre gauge	... 3′—3⅜″
2,948	were narrow gauge	... 2′—6″
638	were narrow gauge	... 2′—0″

Although 5′—6″ is the standard gauge, it will be noticed that metre gauge plays a very important part and has come to stay, at least for some years to come.

The advisability of converting metre gauge railways into broad gauge has been considered for years, and it is often said that as the traffic on metre gauge outgrows the capacity of this gauge it should be gradually converted into broad gauge.

But because of shortness of funds and the fact that unless wholesale conversion of a system is taken in hand gradual conversion would mean break of gauge and constant transfer of transhipment points the process of conversion has been stayed, although it is likely that the metre gauge line from Agra to Hyderabad (Sindh) (*viâ* the Rajputana Malwa and the Jodhpur and Bikaneer Railways) will be converted into broad gauge in the near future to meet the demands of heavy traffic from the United Provinces to Karachee.

II. Out of the total railway mileage of 37,029, the Government owns, 26,889 miles of railways. But out of 26,889 miles only 8,929 miles are worked by direct State Agency; the balance of 17,960 miles is leased to Companies for working and management.

III. The Government share of the money in 26,889 miles of State Railways (open lines) amounted to Rs. 4,81,09,53,000 and the share of the working Companies was Rs. 75,66,53,000 at the end of March 1921 but taking the railways under construction the Government responsibility for capital outlay was Rs. 4,82,65,62,000 against only Rs. 75,66,53,000 of the Companies in respect of the State-owned railways.

Out of this 482 crores the premium paid to Companies by the Government on the purchase of railways over and above the share value of the Companies amounted to Rs. 34 crores. So that the Government of India is the predominating partner in State Railways.

Besides the Government responsibility for Rs. 482 crores, a loan of 150 crores is to be incurred by the Government within the next four years for open line equipment, repairs and renewals and out of this sum certain amounts have already been raised by loans in England.

Large sums of money will be needed if India is going to have more railways. How this sum is to be provided is a very difficult problem to solve. McKay Committee said that India should have 100,000 miles of railways, but the Government of India, Railway Department, in their evidence before the Railway Committee said that 45,000 miles would do for some years to come. At the low rate of Rs. 2,00,000 per mile 160 crores will be minimum requirement for 8,000 miles of more railways, but this is a low estimate.

The cost, at present market rate of land, labour, materials, rolling-stock and rails, will not be too high at 200 crores.

This amount is not a small one. Taking the present rate of Government net gain from railways (which was less than 6 crores during 1920-21) and the condition of the finances of the country it is doubtful whether the Government can find funds for railways out of revenue.

The two courses therefore open are

(1) that the new lines should be made out of money to be borrowed by the Government of India in the country by raising loans, which would remain as national debt of the country and be subscribed by the people of the soil, on which loan an interest of 6 per cent. or thereabouts will have to be paid, which charge will be a debit to the revenues of the new lines;

(2) the second alternative is to raise the money through companies of Indian domicile. But it is to be remembered that

(*a*) in the first place 6 per cent. guaranteed dividend will have to be assured by the Government;

(*b*) secondly, a share of surplus profits will have to be paid;

(*c*) thirdly, the capital of the railways will be inflated after they are purchased on account of payment of premium. With the Government liability for loans and debts on railway account being high it may be considered advisable to adopt the second course, but in that case the Government will have to face the

factor of inflated capital in the long run. While the second course may be suitable for branch lines it is essential that extensions to trunk lines or new trunk lines should be made out of direct borrowings by the State.

IV. The total earnings of State-owned railways during the financial year 1920-21 amounted Rs. 80,99,06,055 and the working expenses were Rs. 54,52,95,675. The nett receipts came to about Rs. 26,46,11,000 and gave a return of about 4¾ per cent. on capital outlay (including premium paid in respect of the purchased railways).

But of this 26·46 crores of nett earnings the following payments were made :

	Crores of rupees.
Share of surplus profits paid to the working Companies	1·73
Annuity payments in purchase of railways, *i.e.*, towards redemption of capital ...	3·90
Sinking funds	0·31
Interest on debt on direct capital spent by the Government and on loans incurred for payment of purchase money paid to companies when acquiring Railways and Interest on Capital spent by companies on State-owned railways	15·74
	21·68

So that the nett gain of the Government was but 4·78 crores of rupees but adding the Government share of the surplus profits from subsidised railways and after deduction of the cost of the Railway Board Office, cost of surveys of new lines, etc., the nett profit to the Government from working of State and subsidised railways was 5·65 (or say 5¾) crores of rupees.

V. The average number of passengers carried and earnings therefrom, and the weight of goods traffic and the goods receipts of all Indian Railways taken together (*i.e.*, for 37,000 miles of railways) were, during the financial year 1920-21, as follows :

Passenger.		Goods.	
No.	Rs.	Tons.	Rs.
559,246,100	40,85,23,000	87,542,000	47,96,84,000

of the total goods traffic coal represented one-fourth of the total tonnage lifted.

VI. Taking all Indian railways together the average distance travelled by a passenger was about 39 miles and the average distance for which each ton of goods was carried, 228 miles.

VII. The total number of engines, passenger carriages and goods vehicles on Indian railways at the end of March, 1921, was as follows :

Engines.	Passenger Carriages.	Goods Vehicles.
9,365	24,951	201,194

VIII. As to the results of working each particular railway the figures are no doubt interesting but to judge the management or working of a particular railway by comparison of its results with two or more other railways is not sound at least in India, because conditions are not alike. For instance, the East Indian railway passes through populous and fertile districts and serves many large cities and the coalfields, and hence its traffic and earnings are very big, and cheap coal and concentrated traffic contribute towards lower working expenses. The G. I. P. Railway on the other hand has very heavy grades to negotiate for the major part of the railway which means limited loads per train and heavy locomotive expenses. It is favourably situated in some ways, for instance, the cotton tracts of Khandesh, Berars and of C. P. are on this line, but in other respects it is not, as the country traversed by the G. I. P. Ry. is not so populous as by E. I. R. The great bulk of its traffic is in one direction and the cost of coal is high owing to the situation of the G. I. P being far away from the coalfields. The North Western railway runs through the wheat grannaries of India and serves many cities but this railway consits of long stretches of strategic and semi-strategic lines and has to collect its traffic from a large number of stations extending over hundreds of miles. The Madras lines have not the traffic of Bengal and Northern lines and the cost of coal on railways distant from the coalfields is heavier than on railways nearer coalfields. On the E. B. Ry. its jute traffic despatched mostly unpressed and unbaled from the Eastern and Northern Bengal to Calcutta accounts for high working expenses. Unpressed jute is light, and therefore the same weight of unpressed jute occupies much more space in a wagon than same weight of say grain and hence more wagons and more trains are needed on E.B.S.R. for jute than would be for grain. In Southern India there is a large amount of vegetable, paddy and other light load traffic.

Anyhow some figures of working results of important broad gauge railways are given in the following pages :

1920-21.

TABLE I.

	Capital outlay per open mile.	Average gross earnings per open mile per week.	Average working expenses per open mile per week.
	Rs.	Rs.	Rs.
B. N. Ry. ...	2,12,239	603	385
B. B. & C. I. Ry. ...	2,13,048	857	573
E. B. Ry. ...	3,90,200	875	535
E. I. Ry. ...	2,81,5'4	980	516
G. I. P. Ry. ...	2,31,823	836	613
M. S. M. Ry. ...	1,86,268	673	432
N. W. Ry. ...	2,02,035	545	396
O. & R. Ry. ...	1,40,461	390	231
S. I. Ry. ...	1,60,061	538	339

The capital outlay includes premium paid to the old companies and the entire cost of improvements and additions up to date.

The E. I. Ry. earnings were the highest and although its working expenses per mile were higher compared to those of some of the other railways (say the O. & R. R., the B. N. R. or the N. W. R.), the percentage of its working expenses to gross earnings was lowest, on account of its enormous receipts, as will be seen from figures in Table No. II.

TABLE II.

Percentage of working expenses to gross earnings.

B. N. Ry.	65·95%
B. B. & C. I. Ry.	67·08%
E. B. S. Ry.	61·08%
E. I. Ry.	57·72%
G. I. P. Ry.	76·76%
M. S. M. Ry.	64·22%
N. W. Ry. (Commercial Section) ...	69·35%
N. W. Ry. (Military Section)	112·2%
O. & R. Ry.	59·20%
S. I. Ry.	63·03%

It will be observed by combining the figures in Tables I and II that although the B. N. Railway figures of working expenses per mile were the lowest, due principally to its nearness to the coalfields, and to heavy coal trains, its percentage of working expenses to gross earnings were about 66% against that of about 58 in the case of E. I. Railway simply because of the fact that the gross earnings of the E. I Railway were large. But inspite of lowest earnings per week mile the O. and R. Ry. working expenses were next lowest to the E. I. R. in proportion to gross revenue.

The G. I. P. Railway working expenses were high owing to heavy grades, limited loads per train, large empty running from the direction of Bombay, owing to its traffic being principally in one direction, and to the cost of coal being high owing to the situation of the railway far away from the coal-fields.

TABLE III.

Average number of passengers in a train.

	Lowest class or third class.	Total.	Percentage of third class passengers to total passengers.
B. N. Ry. ...	225	246	91·5%
B. B. & C. I. Ry. ...	239	278	86·7%
E. B. Ry. ...	183	198	92%
E. I. Ry. ...	222	248	89·5%
G. I. P. Ry. ...	212	229	92%
M. S. M. Ry. ...	281	301	93%
N. W. Ry. ...	324	363	89%
O. & R. Ry. ...	274	302	90%
S. I. Ry. ..	196	207	94·5%

The number of third class passengers was very large and this class is the mainstay of the passenger traffic of Indian Railways; although during recent years the percentage of second class passengers has also increased. Compared to the third class passengers the traffic in the other classes of passenger traffic might be eliminated out of consideration from the point of view of Railway earnings.

TABLE IV.

	Freight, *i.e.*, weight of goods carried.	Dead weight.	Ton miles of all goods trains.
	Ton miles.	Ton miles.	Total.
B. N. Ry. ...	2,068,155	2,375,819	4,443,974
B. B. & C. I. Ry. ...	1,044,870	1,355,098	2,399,968
E. B. Ry. ...	337,742	680,444	1,018,186
E. I. Ry. ..	5,639,812	7,266,212	12,906,024
G. I. P. Ry. ...	2,975,335	3,926,010	6,901,345
M. S. M. Ry. ...	619,987	792,986	1,412,973
N. W. Ry. ...	3,188,052	3,383,812	6,571,864
O. & R. Ry. ...	689,386	690,758	1,380,144
S. I. Ry. ..	143,920	195,489	339,409

The ton miles on the E. I. Railway are the highest owing to its very heavy traffic, especially in coal.

The G. I. P. Railway figures are the second highest due to traffic in cotton, grain and coal.

Next comes the N. W. Railway where the traffic is also heavy in grain and now-a-days in coal too.

B. N. Railway stands fourth. It has a large coal traffic, but other traffic is small.

TABLE V.

Percentage of freight weight and dead weight to total.

	Frieght weight.	Dead weight.	Total.
B. N. Ry. ...	46·5	53·5	100
B. B. & C. I. Ry. ...	48·3	51·7	100
E. B. Ry. ...	33·0	67·0	100
E. I. Ry. ...	43·7	56·3	100
G. I. P. Ry. ...	43·0	57·0	100
M. S. M. Ry. ...	44·0	56·0	100
N. W. Ry. ...	48·4	51·6	100
O. & R. Ry. ...	50·0	50·0	100
S. I. Ry. ...	42·4	57·6	100

Tables IV and V should be studied together.

The freight weight per train on the E. B. Ry. was the lowest, due to the fact that it is a jute-carrying line, and drummed jute (*i.e.*, jute not pressed and baled) is very bulky to carry and gives very light load per wagon. This is the main traffic of the E. B. Railway. This is the only case where the disparity is great, and next comes the S. I. Railway. Here also a large amount of vegetable, paddy and cocoanut traffic accounts for the lesser frieght weight. The O. & R., the B. B. & C. I. and the N. W. Rys. however showed the highest figures of freight load per train.

TABLE VI.

	Average cost of carrying one ton of goods one mile.	Average cost of hauling one ton of goods one mile including interest on capital outlay at 5 per cent.
	Pies.	Pies.
B. N. Ry. ...	2·62	4·05
B. B. & C. I. Ry. ...	4·24	5·89
E. B. Ry. ...	4·50	8·22
E. I. Ry. ...	1·98	3·10
G. I. P. Ry. ...	4·26	5·85
M. S. M. Ry. ...	3·92	5·72
N. W. Ry. ...	3·86	5·85
O. & R. Ry. ...	2·89	4·83
S. I. Ry. ...	4·14	6·53

The working expenses on Indian Railways have considerably gone up during recent years. Firstly, there has been rise in cost of living throughout the world, and India has not escaped from it. The wages have therefore gone up by enormous figures. During 1913-14 the payments to staff on majority of the Indian Railways taken together (A. B.; B. N.; J. B.; B. B. & C. I.; Burma; East Indian; E. B. R.; G. I. P.; B. & N. W.; Madras and S. M.; Nizams; N. W.; O. & R.; R. & K.; and S. I. Railways) amounted to 14 crores only against more than 26½ crores in 1920-21. And the tendency is for the wages to go up higher still.

The cost of imported materials in the shape of rolling stock, engines, machinery has mounted up very considerably.

Then during the war repairs and renewals to the railway property were practically stagnant, but at the same time a

very great strain was put on the wagons, rails, engines, carriages, machinery, etc., for the carriage of war traffic, with the result that deterioration and depreciation was large and fast. The cost of repairs and upkeep of such property is therefore, now high as will be seen from the comparative figures of 1914-15 and 1920-21 given at the end of this chapter.

The cost of coal was also high during recent years, and the incapacity of the railways to carry coal led to the purchase of English Coal on the western lines at a high price. The strain on the western lines by diversion of coal traffic to them (which formerly used to be carried by sea from Calcutta to Bombay, Karachee) was very great. These railways had not had the facilities to carry this traffic; moreover, U. P. grain export traffic, which some years before used to take the Calcutta port went to western ports largely meaning heavier empty running of wagons, involving large increase in working expenditure.

While the percentage of working expenses to gross earnings of Indian Railways taken together in 1912 was but 49 per cent. this percentage rose in 1920-21 to 65½ per cent.

However, the foregoing figures in Table VI are interesting and are reflections of the figures in some of the previous tables.

As might have been expected the cost of haulage on the E. I. Ry. was the lowest, and next came the B. N. Ry. and the O. & R. Ry. figures came closely behind the latter. The E. B. S. Ry. figures are the highest, owing principally to the jute traffic, involving a large number of wagons and trains compared with the number of wagons and trains that would be employed for the carriage of similar amount of coal or grain traffic.

The G. I. P. Ry. figures are the second highest to those of the E. B. S. Ry.

As already pointed out the difference is due to varying conditions prevailing on each line rather than to efficiency or inefficiency of management, which will be further illustrated in the paragraphs that follow.

As already stated, the percentage of working expenses to gross earnings does not always give a correct idea of the actual expenses or of the comparative expenses of various railways under various heads. For instance, on the E. I. Ry. the percentage of working expenses to gross earnings was the lowest, chiefly due to enormous gross earnings and to cheap coal but worked out per mile it was higher than many other lines. To illustrate this further it may be useful to examine still further

figures. For instance, on the B. N. Ry., the maintenance of way and works and stations meant to that line in 1920-21 an expenditure of Rs. 76,52,000, which bore a percentage of 11·89 to the gross earnings of that line. But on the E. I. Ry., a line of lesser length than the B. N. Ry., but of greater traffic, the expenditure under the same head was 1,62,37,000 due to heavier work on the E. I. Ry., and yet owing to the enormous gross earnings of the E. I. Ry. the percentage of this expenditure to gross earnings was but 11·18 against that of 11·89 on B. N. Ry. although the B. N. Ry. spent 86 lacs less than the E. I. Ry. The cost of maintenance and renewal of permanent way per mile of line maintained was as follows on the undermentioned railways :

	Rs.
B. N. Ry. ...	1,129
B. B. & C. I. Ry. ...	1,595
E. B. S. Ry. ...	1,496
E. I. Ry. ...	2,027
G. I. P. Ry. ...	1,581
N. W. Ry. ...	1,551
O. & R. Ry. ...	1,392

The cost per mile was highest on the E. I. Ry. and lowest on the B. N. Ry. and O. & R. Ry. This might have been due to heavy renewals on the E. I. Ry. but the special feature to which I intend to draw attention is that inspite of heavy expenses per mile on the E. I. Ry. the percentage of expenditure on maintenance of way and works to gross earnings on this railway was but 11·18 against that of 11·89 on B. N. Ry. and 14·77 per cent on O. & R. Ry.

Taking the expenditure of the Locomotive Department, there are two main items, (*a*) Running expenses, (*b*) maintenance and renewal of Locomotives :

TABLE VII.

	Running expenses per engine mile.	Maintenance and renewal expenses per engine mile.
	Annas.	Annas.
B. N. Ry. ...	3·04	3·30
B. B. & C. I. Ry. ...	4·36	5·88
E. B. Ry. ...	2·19	2·77
E. I. Ry. ...	2·32	2·89
G. I. P. Ry. ...	4·76	6·51
N. W. Ry. ...	3·59	7·95
O. & R. Ry. ...	2·35	4·36

In the matter of locomotive running expenses, the E. B. State Railway has the lowest or the best figure, owing to the comparative nearness of this Railway to the coalfields, but it is remarkable that the E. B. S. Railway should be better off than the E. I. Railway. The maintenance expenses of the E. B. S. Railway were also the lowest. The E. I. Railway came next to the E. B. Railway under both the heads and yet the E. I. Railway has the advantage of its own collieries, its own steel factory and steel-rolling mills, coke ovens and oil factory. Further in the matter of Indian workshop labour the cost at Kanchrapara on the E. B. Railway could not be less than that of the E. I. Railway at Jamalpur, unless the running staff on the E. I. Railway cost more than on the E. B. Railway. It will be interesting in this connection to examine the average cost of locomotive running staff per head on the E. I. Railway with that of the E. B. S. Railway. There is also another explanation. The E. I. Railway engines did 81 miles per day on an average and the E. B. Railway engines only 64 miles; naturally therefore, the repair and renewal cost on the E. I. Railway would be greater, because with more work done per engine every year the depreciation would be greater, thus requiring more for repairs than engines of same age but with lesser work done. Moreover the haulage of loco coal to the U. P. means greater mileage than from the coalfields to most places on the E. B. S. Railway.

The Oudh and Rohilkhand State-worked Railway comes third in the matter of running expenses and fourth in regard to the maintenance and renewal of locomotives. In the matter of locomotive running expenses the B. N. Railway inspite of its nearness to the coal fields paid 3 annas per mile against 2·35 of the O. & R. Railway.

The cost of coal being high, owing to the distance from the coalfields being very great, the running expenses on the G. I. P. Railway and N. W. Railway were heavy, especially on account of enormous lengths for which coal has to be carried over these lines after it has been delivered to them by the E. I. Railway, and owing to use of English coal. Yet the N. W. Railway compares favourably with B. B. & C. I. Railway and the G. I. P. Railway in the matter of running expenses. In the matter of maintenance and renewals the cost was higher on the N. W. Railway, G. I. P. and B. B. & C. I. Railways than on other railways, owing perhaps to the location of the shops at Bombay and Lahore where the cost of labour is greater than anywhere else, and in the case of Lahore the haulage of coal for use in the loco and carriage shops and of other raw and manufactured materials involves great distances, meaning more cost of haulage of coal and materials.

The foregoing facts and figures distinctly go to show that the differing traffic and other conditions show different results.

The discussion in this chapter and the analysis of figures herein made will help us considerably when we come to the discussion on the Acworth Committee report particularly on the point of efficiency of State or Company management.

Compared with 1914-15, the cost of maintenance and renewal of locomotives was exhorbitant in 1920-21, due to reasons already stated as shown below :

TABLE VIII.

	Annas per train mile.	
	1914-15.	1920-21.
B. N. R. ...	2·71 ...	4·39
B. B. & C. I. R. ...	2·55 ...	7·23
E. B. S. R. ...	2·99 ...	4·10
E. I. R. ...	1·71 ...	4·11
G. I. P. R. ...	4·77 ...	7·86
N. W. R. ...	4·78 ...	10·74
O. & R. R. ...	2·09 ...	5·21

Similar results are also seen in the carriage and wagon expenses :

TABLE IX.

Cost of maintenance and renewals of goods vehicles.

	Annas per train mile.	
	1914-15.	1920-21.
B. N. R. ...	1·96 ...	5·76
B. B. & C. I. R. ...	1·69 ...	3·58
E. I. R. ...	0·99 ...	3·41
G. I. P. R. ...	2·57 ...	4·41
M, S. M. R. ...	1·54 ...	4·54
N. W. R. ...	1·48 ...	4·09
O. & R. R. ...	1·09 ...	2·62

Under both Loco and Wagon the rise in wages, the higher cost of materials, oil, coal, and the heavy work done, during the war, by rolling stock, without proper overhauling, renewals and replacements, account for the heavy expenditure in 1920-21.

Table X.

Cost of maintenance and renewals of permanent way per train mile.

	Annas per train mile.		
	1914-15.		1920-21.
	1st half-year.	2nd half-year.	
B. N. R.	2·09	2·13	4·39
B. B. & C. I. R.	3·22	8·86	6·08
E. B. S. R.	3·51	2·90	6·59
E. I. R.	3·01	2·65	5·64
G. I. P. R.	4·98	2·35	5·41
M. S. M. R.	5·20	5·26	8·86
N. W. R.	4·19	5·19	9·79
O. & R. R.	2·31	5·08	8·36

Under this head also there was a general rise.

The total "Traffic expenses" were exceptionally heavy in 1920-21.

Table XI.

	Annas per train mile.	
	1914-15.	1920-21.
B. N. R.	5·75	9·24
B. B. & C. I. R.	6·69	14·27
E. I. R.	6·26	9·48
G. I. P. R.	6·26	11·31
N. W. R.	7·27	15·55
O. & R. R.	6·51	12·53

The traffic expenses were heavy in 1920-21 due principally to rise in wages, in cost of loading and unloading of goods, in cost of printing of tickets and forms, oil, stationery and uniform clothing.

The foregoing comparisons are sufficient to show that the recent enhancements of railway fares and rates were rendered necessary to meet the high cost of working; the traffic being almost up to the maximum capacity of the railways they could not adopt the other method, *viz.*, that of reducing the railway rates to increase the traffic and revenue. But when the facilities for movement of more trains and rolling stock to carry more traffic are adequate then in the interests of the railways and the public, also of the Government revenue, reductions in rates and fares would be advisable, particularly for long distances,

because it is seen that in the case of passenger traffic in the lowest class long distance traffic is small and limited, and in the case of goods traffic low railway rates to develop internal long distance traffic, in local as well as in through booking between two or more railways, will be required. In U. S. A. it is held that the aim of the railways should be to pay more attention to internal trade as the prosperity of the inhabitants is secured more by internal trade than by external trade especially in a country where the agricultural and mineral resources, the population and the area of the country are vast and industries can be developed internally. These remarks to a certain extent apply to India as well, particularly at the present moment when the country is realising the benefit of developing and is trying to develop its vast resources and to create and enlarge its industries and thus to find employment for a larger number. Americans say "Manufacturing and mining towns are the heaviest shippers" and that the places "which are seats of special industries make payments to railways out of all proportion to their apparent size and activity." It is admitted that this is specially common and probable in the U. S. A., but it is more or less true everywhere. Further, it is also true that as the distance increases the cost of transportation begins to add to the cost of a commodity at the consuming market, and that a point "is often reached when the traffic is burdened with the cost of transportation, and discouraged and decreased" and in such cases it is best for railways to pull up the traffic by low rates for the longer hauls before the traffic falls. But this is only possible when wagons are adequate and can be spared from the already existing traffic to carry additional traffic for long distances and facilities to move such wagons at a fairly reasonable speed are sufficient, so that the wagons can be turned round quickly.

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